Isolating the Grammar: Removing Extra-Grammatical Effects from the Theory of

Grammar Through Investigation of Grammatical Viruses

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This dissertation investigates grammatical viruses, ad hoc rules created by

speakers in an attempt to mimic prestige input received, for example, through

prescription. Examples of phenomena regulated by grammatical viruses include

the distribution of *whom* and nominative pronouns in conjoined noun phrases *(Bill*

and I). Understanding of the mechanisms licensing these phenomena is necessary

for the linguist who uses speakers' production and judgments in developing

theories of the grammar itself. An experimental investigation is conducted and

leads to the conclusion that even young children are sensitive to the input that

triggers grammatical viruses, although the rules they formulate are, at first, very

general and are refined later in development. The dissertation also works toward

formulating grammatical virus rules that can account for the distribution of certain

virus phenomena. A major finding is that grammatical virus rules can be stated

without reference to objects internal to the grammar, and cannot actually carry out

grammatical operations. This allows for the maintenance of a theory in which the

grammar has only very shallow interaction with other cognitive modules.

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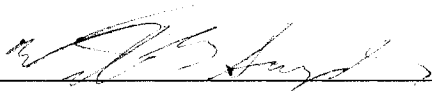Doctor of Philosophy Dissertation

Isolating the Grammar: Removing Extra-Grammatical Effects from the Theory of
Grammar Through Investigation of Grammatical Viruses

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Chapter 1. Background and the Research Problem

1.1. Introduction

When building a theory of generative grammar, one seeks to capture facts about the linguistic competence of native speakers. However, our access to information about linguistic competence is clouded. Whether gathered through observation of naturalistic production or through formal or informal experimental methods, linguistic data is affected by performance factors including memory, distraction, and fatigue.

In this dissertation, I investigate another factor that obscures pure linguistic competence: grammatical viruses. Sobin (1997) defines a grammatical virus as a "a device that can read grammar and affect it, though it is grammar-external" (319). Grammatical viruses are the products of people's ideas about grammar obtained through schooling and perception of "sophisticated language." In English, they affect such phenomena as use of the word *whom* and the case of pronouns in conjoined noun phrases. They are claimed to be the source of the "prestige uses" of *whom* (Lasnik and Sobin 2000) and the nominative pronoun *I* (Sobin 1997) in (1), as well as the "overcorrections" in (2) (my examples).

(1) a. Jill asked whom he saw.
    b. Klaus and I went to the store.

(2) a. Jill asked whom he thought would win.
    b. They gave the books to Klaus and I.

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The goal of this dissertation is to answer the following questions: What exactly are these grammatical viruses? How do they operate? Is their influence limited to certain areas of the grammar? And perhaps most importantly, how can we identify them so that their effects are not mistakenly taken to reflect linguistic competence? In the remainder of Chapter 1, I review existing literature on grammatical viruses and introduce some of the open question that remain. In Chapter 2, I approach these questions from the perspective of language acquisition and development. I show that children who have not yet entered elementary school do not use grammatical viruses in production except in rare instances, although they do broadly accept virus forms in judgment tasks. Later in development, speakers do begin to use grammatical viruses in their production, and the range of environments in which they accept virus forms narrows. This development occurs later than the age at which children begin using naturally acquired constructions and is based on direct negative evidence received through prescriptive teaching and on indirect negative evidence. Chapter 3 is devoted to answering the questions of how grammatical virus rules are formulated and what their relationship is to grammatical operations. With the results of Chapters 2 and 3 in place, in Chapter 4 I compare the relatively established grammatical viruses with potential ones in order to demonstrate how grammatical viruses might be identified (or a claim of their presence refuted) and to move toward a deeper understanding of the grammatical virus's range of influence.

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1.2. Notation

Throughout the dissertation, I will be discussing example sentences that fall into several categories: sentences licensed only by the grammar, sentences that are unacceptable because they fail to meet a requirement of the grammar, sentences that require licensing from the grammar and from grammatical viruses, and sentences that are unacceptable only because they fail to be created or licensed by grammatical viruses. Conventionally, sentences of the first type are called "grammatical" and are given without additional notation, and sentences of the second type are called "ungrammatical" and are marked with a star (*). Whether sentences of the other two types are considered grammatical or ungrammatical depends upon one's theory of grammatical viruses. (My position will be made clear in Chapter 3.)

I will follow the notation of Lasnik and Sobin (2000): If a sentence is acceptable, even if its licensing involves a grammatical virus, it will not have any additional notation. A sentence that would have otherwise been acceptable, but is not because it fails to be produced or licensed by a grammatical virus will be marked by an exclamation mark (!). I also sometimes make use of the terminology of Lasnik and Sobin, calling acceptable sentences whose licensing involves grammatical viruses "slippers" and sentences that are unacceptable because of their failure to be licensed by grammatical viruses (sentences marked with !) "catchers."

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In some cases, it may be unclear whether a grammatical virus is relevant to the acceptability status of a sentence. In those cases, the discussion should make the situation transparent.

1.3. The Development of Virus Theory

1.3.1. Prescriptive evidence for a linguistic phenomenon

That exposure to prestige language produces some surprising results is not a new observation.[1] Prescriptive grammarians have long been admonishing people for overcorrections made in an attempt to produce prestige language. For example, with respect to use of the word *whom*, Johnson (1982), in *The Handbook of Good English*, warns:

> *I invited people whom I thought would get along together* is just as wrong as *I thought them would get along together*. The pronoun *whom* is the subject of *would*, not the object of *thought*, and it should therefore be *who*....Similarly, *Whom did you say was being invited?* is wrong....Sophisticated people make this error too...
> (16)

Noting another common overcorrection, Johnson writes, "Put the object of a preposition in the objective case. *I don't understand what's going on between he and Joan* and *She wrote the most lovely apology to John and I* are embarrassing, foolish errors" (20).

We can conclude from these comments that the teaching of prescriptive grammar does not always have the intended result. Prescriptivists tend not to bother correcting non-existent errors; the fact that prescriptivists comment on the forms above is evidence for their presence among language users. While many

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prescriptive rules for English attempt to emulate Latin or to maintain older forms of the language, their teaching may result in speakers using forms that do not contribute to these goals. As a consequence, manuals like *The Handbook of Good English* continue to correct the public's "errors." Some linguists, however, have addressed the question of why these forms arise.

1.3.2. Emonds (1986)

Emonds (1986) takes up the issue of the case of pronouns, noting that in casual speech, English speakers tend toward the accusative, as in (3a), despite prescriptive pressure toward the nominative.

(3) a. Mary and him are late.
    b. Mary and he are late.

He adds that those speakers who do use the nominative, as in (3b), tend also to overcorrect, as in (4b), although both casual speech and prescriptive grammar favor (4a).

(4) a. They prefer not to think about James and me more than necessary.
    b. They prefer not to think about James and I more than necessary.

Emonds' analysis of this state of affairs begins with the idea of morphological transparency. The underlying observation is that English does not have a phonologically realized nominative case marker on its (non-pronoun) noun phrases; that is, nominative case is not morphologically transparent on English noun phrases. Emonds takes this as an indication that abstract nominative Case is never realized morphologically in English. This means that English requires a

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[1] By "prestige language," I mean certain usages that are taught to be correct and/or are associated with educated or high class speech.

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separate system from the abstract Case system to determine its distribution of morphologically nominative pronouns. Thus, it is not surprising that English (morphologically) nominative pronouns do not appear in exactly the same places as, for example, Latin nominative pronouns. The distribution of the latter is determined by an abstract Case system, while the distribution of the former is not.

In (5) is Emonds' definition of morphological transparency. (6) is his statement that morphological transparency correlates with the morphological reflex of an abstract feature system.

(5) Definition: A syntactic category C is "morphologically transparent" on B if and only if a productive number of pairs of simple B which contrast with respect to C also differ phonologically.   (Emonds 1986: 106)

(6) Morphological Transparency: An abstract (e.g. case) feature C of a category B is realized on the lexical head of B in a language if and only if the C is morphologically transparent.   (Emonds 1986: 107)

The way these statements apply to two languages, English and German, is shown below.

	English	German
Examples of noun phrases that appear in nominative and accusative position:	I/me she/her the boy/the boy the man/the man	Ich/mich sie/sie der Junge/den Jungen der Mann/den Mann
	No productive distinction in English	Productive distinction in German
By definition (5):	Nominative Case is not morphologically transparent on English NPs.	Nominative Case is morphologically transparent on German NPs.
Therefore, by principle (6):	Morphological case on English NPs ≠ abstract Case.	Morphological case on German NPs = abstract Case.

Table 1   Application of "Morphological Transparency" to nominative Case in English and German

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In this table, I have compared subject and object NPs to look for a morphological difference. In fact, what is relevant to Emond's definition of morphological transparency is the fact that noun phrases with nominative Case are not distinguished phonologically from *any* other noun phrases in a productive number of pairs in English. This means, according to the principle called Morphological Transparency, that although English noun phrases may have abstract nominative Case, it is never realized phonologically, and whenever it appears to be, there is actually another force at work.

If the distribution of (morphologically) nominative NPs cannot be governed by an abstract Case system, then how *is* it determined? Emonds proposes English has "local transformations" determining the distribution of morphologically nominative NPs. One such local transformation is given in (7).

(7) PRONOUN – INFLECTION → PRONOUN$_{Nom}$ INFLECTION /
    INFLECTION governs PRONOUN   (adapted from Emonds 1986)

Rule (7) results in nominative NPs when the NPs are simple subjects as in (8).

(8) She read the book.

However, according to the definition of government adopted by Emonds, it will not produce nominative in conjoined NP subjects. An English speaker for whom (7) is the only means of producing nominative NPs will have (9a), but not (9b), in his or her grammar. Since (7) does not produce nominative pronouns in conjoined noun phrases, they appear in the accusative form, which is the default form in English.

(9) a. Mary and him are late.
    b. Mary and he are late.

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Emonds proposes that a speaker who does have (9b) in his grammar has an additional *ad hoc* local transformation, like (10), allowing some degree of conformity to the prescriptive standard.

(10) A pronominal NP following *and, or, but, than, as* is subjective [nominative].
(Emonds 1986: 116)

And, as Emonds emphasizes, this additional transformation does result in nominative in (9b), but it just as straightforwardly produces the "overcorrection" (11).

(11) They prefer not to think about James and I more than necessary.
(Emonds 1986: 93)

According to Emonds' approach, the grammar is made up of two kinds of rules: abstract grammatical principles and local transformations. The distribution of morphologically nominative NPs is determined in German by abstract grammatical principles, and in English by local transformations. The existence of two different systems for nominative NPs in the two languages is supported by the fact that English has, and German lacks, a distinction between what Emonds calls normal usage (NU) and prestige usage (PU). The abstract Case system in German always produces nominative NPs in conjoined and non-conjoined subjects, but never in direct or indirect objects, precisely the prestige pattern mimicked by local transformations in English.

(12) a. Ich   fahre
        1sg.nom drive.1sg.pr
        'I drive.'

     b. * Mich   fahre
          1sg.acc drive.1sg.pr

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(13) a. Marie und ich   fahren
         Marie and 1sg.nom drive.pl
         'Marie and I drive.'

     b. * Marie und mich   fahren
         Marie and 1sg.acc drive.pl

(14) a. Er   liebt   Marie und mich
         3sg.nom love.3sg.pr Marie and 1sg.acc
         'He loves Marie and me.'

     b. * Er   liebt   Marie und ich
         3sg.nom love.3sg.pr Marie and 1sg.nom

(15) a. Das ist   für Marie und mich
         this be.sg.pr for Marie and 1sg.acc
         'This is for Marie and me.'

     b. * Das ist   für Marie und ich
         this be.sg.pr for Marie and 1sg.nom

Furthermore, English speaking children are prone to "errors" in which they under-use the nominative case relative to the prescriptive standard, often producing (16a) until being taught that (16b) is correct.

(16) a. Mary and him are late.
     b. Mary and he are late.

German speaking children make no such errors (Schütze 1995; Clahsen 1984).

The idea that something other than abstract grammatical principles is at work in phenomena such as the distribution of nominative pronouns in English is one that is maintained in later work on the topic. However, this approach raises two issues which are addressed differently in later work. The first is that Emonds' local transformations are considered to be a part of the grammar, despite their being learned late and used inconsistently. This assumption is challenged in Sobin (1997) and Lasnik and Sobin (2000). The second issue is that in Emonds' system,

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all nominative pronouns are produced by local transformations, even in sentences like (17), where all Standard English speakers, whether child or adult, would use the nominative.

(17) She read the book.

Remember that Emonds claims that all English speakers have the local transformation (7), with some speakers later adding the transformation (10). This mixed character of local transformations is puzzling; some of them are part of the naturally acquired grammar, and some are *ad hoc* rules adopted by speakers to mimic prestige usage. Sobin's (1997) system, discussed below is different in this regard; he proposes a special type of rule for prestige-mimicking pronoun use, and this type or rule occurs only outside of the grammar.

1.3.3. Sobin (1997)

Sobin (1997) offers an account that solves both of the problems raised by Emonds' (1986) analysis of nominative pronouns. According to his analysis, *me* is the only form of the first person pronoun produced by the grammar of English in conjoined noun phrases. Any uses of *I* in conjoined noun phrases are produced by extra-grammatical rules, which he dubs "grammatical viruses," that arise in speakers' knowledge of language after exposure to prestige language or imitations of it. (*I* as a non-conjoined subject is produced by the grammar.)

Here are two examples of grammatical virus rules, as presented in Sobin (1997). The *"and I"* Rule checks nominative Case on a first person singular pronoun following the word *and*.

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(18) The "...*and I*..." Rule
   If: ...and [$_{Pm}$ +1, +sg, NOM]...
           1   2
   Then: check NOM on 2.   (Sobin 1997: 336)

The "*that she*" Rule checks nominative Case on a third person singular pronoun following a complementizer.

(19) The "*that she*..." Rule
   If: ...that [$_{Pm}$ +3, +sg, NOM]...
           1   2
   Then: check NOM on 2.   (Sobin 1997: 336)

Although Sobin states the "*that she*" Rule with the complementizer *that* in its context, it is clear from his discussion that the rule is also meant to apply when *she* follows a null complementizer, as in (20).

(20) She and John left.

According to Sobin's system, for both first and third person singular pronouns, another mechanism within the grammar can check accusative Case (he suggests a rule checking accusative as a default Case), but if the speaker has the relevant virus rule, nominative Case can be checked instead.[2] In the (a) examples of (21) and (22) below, accusative Case has been checked within the grammar. In the (b) examples, nominative Case has been checked by one of the grammatical viruses above.

(21) a. Paul saw John and me at the movies.
     b. Paul saw John and I at the movies.

(22) a. I heard that him and Laura were dating.
     b. I heard that he and Laura were dating.

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[2] In addition to applying in contexts where the pronoun would otherwise be accusative, such as in (22), the "*that she*..." rule can vacuously apply in contexts where the grammar would check nominative Case on the pronoun, as in (i).
(i) I heard that she was going to college next year.

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Note that the *"and I"* Rule and the *"that she"* Rule are not meant to generalize to the whole pronoun system; the former applies only to first person singular pronouns, and the latter applies only to third person singular pronouns.

In this system, only those parts of linguistic knowledge that seem to be (optionally) employed in response to prestige input are attributed to a different type of rule than those of the regular grammar. Since these grammatical virus rules are not a part of the grammar, their unusual properties are not surprising. Sobin (1997) discusses the following properties, which he claims are characteristic of grammatical viruses.

1.3.3.1. Lexical Specificity

Unlike normal grammatical processes, grammatical viruses may be sensitive to particular lexical items. Sobin's virus rules may be sensitive to a particular lexical item (such as the word *and*) or to a class of lexical items (such as complementizers or pronouns).

1.3.3.2. Directionality

Grammatical viruses may apply in one direction or the other. For example, the *"...and I"* rule (18) checks nominative Case on a pronoun following, but not preceding, *and*. Quattlebaum (1994) shows experimentally that the effect of the virus is directional. She asked 46 ninth-grade students to select the prestige forms from pairs of sentences of the types in (23) and (24).

(23) a. John and I left.
    b. John and me left.

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(24) a. I and John left.
   b. Me and John left.

Quattlebaum's subjects selected phrases of type (23a) in favor of (23b) 100% of the time. When given the choice in (24), however, (a) was chosen only 26% of the time.[3,4]

1.3.3.3. Adjacency

This property refers to Sobin's claim that the element affected by a grammatical virus must be adjacent to the context that triggers it. Sobin points to the "*that she…*" rule as evidence for this property. In selecting the prestige forms from the pairs of the types in (25) and (26), subjects selected (25a) 75% of the time, but selected (26a) only 51% of the time. The source of this difference, Sobin claims, is that in (25), the pronoun is adjacent to the (null) complementizer, while in (26) it is not.

(25) a. She and John left.
   b. Her and John left.

(26) a. John and he left.
   b. John and him left.

This apparent sensitivity to adjacency between the complementizer and the pronoun is why Sobin coins the virus the "*that she…*" rule.

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[3] Quattlebaum's subjects were split into two groups. One group (22 subjects) selected (24a) 17 % of the time, and the other group (24 subjects) selected (24a) 35% of the time. The results of the two groups have been combined for reporting here.

[4] Prestige usage would always put the first person pronoun last in a conjuction, so the acceptability of either version of (24) should be lower than its counterpart in (23) as a prestige form. Since both (24a) and (24b) share this shortcoming, and since subjects were asked to select the prestige form (and not, for example, the most natural form), it is still safe to conclude from these data that the rule mimicking prestige usage licenses *I* only after *and*, and not before.

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This argument assumes that grammatical virus rules can be sensitive to grammatical elements that are not phonologically realized, an assumption for which there is no independent evidence. Perhaps what we are seeing here is actually a further effect of directionality—a grammatical virus licensing nominative third person pronouns before, but not after, *and*.

Another way to look for adjacency effects is by inserting modifiers or parentheticals between the affected element and the conditioning environment. In (28b), we see this destroying the licensing environment for the nominative pronoun *I*.

(27) a. John will help you and me.
     b. John will help you and I.

(28) a. John will help you and, hopefully, me.
     b. * John will help you and, hopefully, I.

1.3.3.4. Nonlocality

By "nonlocality," Sobin means that grammatical viruses are insensitive to constituents that are not projected from lexical heads. This claim is meant to restrict the parts of a sentence that are relevant for determining adjacency. Nonlocality means that grammatical viruses ignore phrases whose heads are not independent lexical items, even if they are adjacent to the element affected by the grammatical virus. As an example, Sobin notes that in (29), the *"that she"* Rule would check nominative on NP_2, although it is not the most local NP to the complementizer that conditions application of the rule. The rule ignores NP_1,

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which is the structurally closest NP to the complementizer, since it is not projected from a lexical head.

(29) ...[$_C$ Ø/that] [$_{Agr-sP}$[$_{NP-1}$ NP$_2$ and NP$_3$]...   (Sobin 1997: 332)

Once again, this argument rests on the assumption that a grammatical virus can recognize the null complementizer in (29), although the null complementizer is not visible in the surface string.

1.3.3.5.Overextension and underextension

These terms are used to point out that grammatical virus rules do not perfectly reproduce the results of grammatical processes or the recommendations of prescriptive rules (which, themselves, tend to be based on the grammatical processes of other languages, such as Latin). Cases of hypercorrection are examples in which a virus has overextended. Despite being a common hypercorrection in English, nominative Case in the conjoined object of a preposition, as in (30), is not in accordance with prescriptive rules, nor is it found in languages such as German that grammatically require nominative Case in conjoined subjects (as shown in section 1.3.2).

(30) This is between you and I.

A single grammatical virus also may fail to cover all the cases of the grammatical process that it mimics, and this is underextension. For example, the "*and I*" virus does not affect pronouns preceding *and*; the "*that she*" virus operates in that environment. Presumably, the same grammatical process produces nominative pronouns both before and after the conjunction in German.

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1.3.3.6. Comments on the "signature properties"

Some of the properties discussed by Sobin make sense as properties of extra-grammatical rules in that they are properties that we would not expect normal syntactic processes to have. We expect grammatical processes to show sensitivity to lexical categories at some level of abstraction, but not to specific lexical items. While surface adjacency plays a role in phonological processes, in syntax we regularly see long distance dependencies. These fundamental differences in the way normal grammatical processes and grammatical viruses work lead us to expect that their empirical coverage will be different, leading to the observation that virus rules may overextend and/or underextend.

What we expect of grammatical processes with respect to properties 1.3.3.2, directionality, and 1.3.3.4, nonlocality, depends on the specific syntactic theories adopted. In discussing directionality, Sobin points out that "although [it has] been discussed in connection with normal grammatical processes, [its] use here is unusual." The *"and I"* Rule, he notes, applies only to the right conjunct, and not to the left conjunct (330). It is not clear, however, that this type of asymmetry could not be produced by a normal grammatical process. Considerable evidence has been presented in, for example, Munn (1993) showing that the first conjunct is structurally higher than the second conjunct. This opens the door to the possibility that the structural asymmetry between the two conjuncts could result in different Case checking possibilities. While it would not be the order of the conjuncts *per se* that caused differences in their Case properties, their order

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would be a reflection of their hierarchical structure, which could have such an effect. Since no other examples of directionality are given in Sobin (1997), directionality is called into question as a signature property of grammatical viruses.

As for nonlocality, a particular theory of the structure of conjoined noun phrases is once again involved in Sobin's discussion. Recall that Sobin asks us to assume the "rough structure" in (29), repeated below as (31).

(31) ...[$_C$ Ø/that] [$_{Agr-sP}$[$_{NP-1}$ NP$_2$ and NP$_3$]...   (Sobin 1997: 332)

The coordination of two noun phrases is taken to form another noun phrase without a lexical head. Sobin therefore can say that the *"that she"* virus ignores NP$_1$, which structurally would be the most local noun phrase to the complementizer conditioning operation of the virus. NP$_1$ is ignored by the virus because it is not projected from a lexical head. Alternative analyses of conjunction would not be open to this line of argument. For example, in the analysis of Munn (1993), the conjunction and the second conjunct form a Boolean Phrase (BP), which is adjoined to the first conjunct.

(32) [$_{NP}$ [$_{NP}$ John] [$_{BP}$ and [$_{NP}$ Mary]]]

This analysis of conjoined NPs does not support the claim that virus rules ignore non-lexically headed constituents because the largest NP in (32) is lexically headed by the head of the first conjunct.

Fortunately, Sobin gives another example supporting this purported property of grammatical viruses. He compares the possibility of applying the *"and I"* Rule in (33a) and (33b).

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(33) a. For Mary to be the winner and [SC I the loser] is unfair.
    b. For Mary to be the winner and [IP me/??I to be the loser] is unfair.

(Sobin 1997: 331)

He claims that the virus is prevented from operating in (33b) by the IP, projected from *to*[5], which intervenes between *and* and the following pronoun. On the other hand, the virus completely ignores the presence of the small clause boundary in (33a), since it does not have a lexical head.

The resolution of the questions raised here will depend, in part on having a greater number of grammatical viruses over which to generalize. Lasnik and Sobin (2000) discuss another grammatical virus which may contribute to allowing a more precise formulation of the properties of grammatical viruses.

1.3.4. Lasnik and Sobin (2000)

Lasnik and Sobin (2000) argue convincingly that English speakers' use of the word *whom* is governed by grammatical viruses. The prescriptive rule for *whom* is that it should be used in accusative positions. However, there are certain accusative positions in which *whom* seems decidedly out of place, as well as nominative positions in which one might hear *whom*. (34) and (35) illustrate two examples of the former situation, and (36) illustrates the latter.

((34)-(36) from Lasnik and Sobin 2000, with some replacements of * by !)

(34) a. It was I.
    b. It was me.
    c. Who was it?
    d. ! Whom was it?

---

[5] An non-finite IP is taken to be relevant for grammatical viruses because it has a lexical head, *to*. Although he does not discuss this point, it appears from Sobin's discussion that finite IPs would not be considered lexically headed and would not be relevant to grammatical viruses.

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(35) a. With what?
    b. To where?
    c. For who?
    d. For whom?

    e. What with?
    f. Where to?
    g. Who for?
    h. ! Whom for?

(36) a. We feed children whom we think are hungry.
    b. Writers whom we must all admit are honest in their intentions have treated unpleasant subjects.   (Lasnik and Sobin 344-346)

(34a), with a nominative pronoun, is a form encouraged by prescriptive grammar. However, (34b), with an accusative pronoun, is the form more likely to be used in casual speech. If the Case system for wh-words were analogous to that for pronouns, Lasnik and Sobin reason, we would expect that (34d) would be more common than (34c) in casual speech. In reality, (34c) is the only possible form.

(35) illustrates the phenomenon labeled "swiping" by Merchant (2002). In certain PP questions, the order of the preposition and wh-word can be inverted (35e-g). But if the wh-word is *whom*, swiping is impossible. (Or, to put it another way, it is impossible to substitute *whom* for *who* when swiping has occurred.)

In (36), we find two sentences with relative clauses in which *whom* originates in subject positions, where NPs should have nominative Case. Prescriptive grammar does not condone use of *whom* in this situation, and yet, such examples are attested; Lasnik and Sobin label them slippers.

These examples are meant to demonstrate that the distribution of *whom* in English cannot be due entirely to either the natural grammar or prescriptive rules.

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If the natural grammar determined distribution of *whom*, we would expect its presence in (34d) and (35h). If prescriptive rules entirely determined the distribution of *whom*, we would not expect its presence in (36).

A potential objection to this argument is that it may be that *whom* is used only in a formal register of speech. Given the plausible claim that swiping is not acceptable in this formal register, the non-occurrence of (35h) is explained. Similarly, if the formal register does not allow an accusative pronoun as the complement of *be*, as in (34b), then there is no reason to expect an accusative-marked wh-word to originate from that position. In the casual register, *whom* is not used at all, so (34d) will not be acceptable in either the formal or the casual register.

This approach will not be sufficient, however, to explain the data in (36). If the formal register adheres to the prescriptive rule that *whom* appears in accusative positions, then the examples in (36), repeated below as (37), should be ruled out on par with (38).

(37) a. We feed children whom we think are hungry.   SLIPPER
    b. Writers whom we must all admit are honest in their intentions have treated
       unpleasant subjects.   SLIPPER

(38) a. ! Whom is hungry?   CATCHER
    b. ! Whom is honest in his intentions?   CATCHER

We must conclude that, while prescriptive grammar encourages the use of *whom*, especially in formal settings, the specifics of many speakers' usage are determined not by the prescriptive rule, but by another rule system.

Lasnik and Sobin present two grammatical virus rules to account for the distribution of *whom*. They are given below.

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(39) The Basic 'whom' Rule
   If: [$_{V/P}$] *who-*   *-m*
         [ACC]   [ACC]
          1   2   3
   then: check ACC on 3.   (Lasnik and Sobin 2000: 354)

(40) The Extended 'whom' Rule
   If: *who -m*   ... *NP,*   where
         [ACC]
          1   2   3
   a) 3 is the nearest subject NP to 2, and
   b) '...' does not contain a V which has 1-2 (a single word *whom*) as its
       subject
   then: check ACC on 2.   (Lasnik and Sobin 2000: 359)

In both rules, *whom* is made up of *who* and *–m,* and *who* carries its own Case

feature, which is checked by the normal Case-checking process within the

grammar. The *-m* in *whom* is taken to carry an extra accusative Case feature. The

licensing of *whom* amounts to the checking of this feature.

The Basic 'whom' Rule checks the extra accusative Case feature of *–m*

when *who* has accusative Case and follows a verb or a preposition. This accounts

for the presence of *whom* in examples like those in (41).

(41) a. For whom did Zelda buy a present?
     b. Who saw whom?
     c. Who spoke with whom?
     d. Who considers whom (to be) underpaid?   (Lasnik and Sobin 2000: 356)

The Basic 'whom' Rule crucially requires that *whom* appear in an accusative Case

position. This prevents licensing of whom in the catcher (42), where *whom*

follows a verb, but is not in an accusative Case position.

(42) ! I know whom left.

The Extended 'whom' Rule is needed to check the extra accusative feature

of *–m* when *whom* is displaced from its position adjacent to a verb or preposition.

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Its formation allows for the prestige forms (43a-b, e-f), but also permits the non-prestige forms (43c-d), which are slippers. The examples in (44), which are catchers, are not licensed by the Extended 'whom' Rule.[6]

(43) a. Whom did you see?
    b. Whom have we here?
    c. We feed children whom we think are hungry.
    d. ..., people whom I think ought to hate me.
    e. Whom will it be?
    f. And whom do you think it is?

(44) a. ! Whom saw Mary?
    b. ! Whom has been visiting Berlin?
    c. ! Whom is it?
    d. ! Whom are you?
    e. ! Whom is the person in the blue shirt?   (Lasnik and Sobin 2000: 358)

Note the predictions made by Lasnik and Sobin's two-rule system. First, there can be speakers who have only the Basic 'whom' Rule. These speakers are predicted to accept the sentences in (41) and reject those in (43) (as well as those in (42) and (44)). Other speakers may have both the Basic 'whom' Rule and the Extended 'whom' Rule. These speakers should accept the sentences in (41) and (43). The Basic 'whom' Rule, as the name suggests, is considered to be the most basic way of licensing *whom*, and it is assumed that there will be no speakers who have the Extended 'whom' Rule and lack the Basic 'whom' Rule.

1.4. Questions to be answered and the approach to be taken in this dissertation

The form and properties of grammatical viruses found in the works discussed in Section 1.3 are a useful beginning in our understanding of these

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[6] (44c-e) are ruled out because Lasnik and Sobin (2000) claim that "subject" in the "whom" rules should be defined semantically such that *whom* is a subject in these sentences. This will be discussed further in Chapter 3.

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extra-grammatical effects on language. They also reveal many unresolved issues, among them the following:

As discussed in Section 1.3.3, there are questions about the reliability of some of the properties that Sobin (1997) claims to be characteristic of grammatical viruses. We can summarize the question of "signature properties" as follows: How are grammatical virus rules properly stated? What we need is a set of guidelines concerning what these rules can look like and what they can do. A related issue is to what extent, if any, a statement of a grammatical virus rule can be generalized across speakers. If grammatical virus rules are *ad hoc* rules created by individual speakers, is it really possible to explicitly state particular rules for a population, or can the rules adopted vary greatly among speakers? Assuming that variation is possible, what are the limits on this variation?

Another critical set of questions concerns the use of grammatical viruses. If a speaker has a virus rule as part of his or her linguistic system, what does this mean for production and for acceptability judgment? Clearly, speakers do not make use of grammatical virus rules in every possible instance in production; we have already noted that virus forms alternate with non-virus forms. But will a speaker with access to a virus rule always make use of it in acceptability judgments of virus-produced forms, or is use of the virus rule more sporadic?

Finally, what is the pattern of acquisition of virus-produced forms? Grammatical viruses have been defined as arising in response to pressure toward prestige usages, as in prescriptive grammar. It is not clear, though, to what extent

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virus-produced input is present for young children, and what effect its presence will have on children's language use.

Despite these looming questions, a small number of authors have taken grammatical virus approaches to other puzzling linguistic phenomena. Specifically to be discussed in this dissertation are Sobin's (1997) analysis of plural agreement in expletive constructions (45) and McDaniel, McKee and Bernstein's (1998) analysis of preposition pied piping (46).

(45) There are men in the room.

(46) That is the pen with which I wrote.

In both cases, the authors have taken the constructions in question to be produced by grammatical viruses. Evaluation of these proposals is especially difficult, precisely because of the many open questions about the nature of grammatical viruses.

In Chapter 2 of this dissertation, I address questions concerning use and acquisition of grammatical virus rules through examination of empirical data. These data come from two sources: acceptability judgments that have been collected from subjects ranging from kindergarten age until adult, and transcripts of spontaneous speech. These data are used to determine the pattern of acquisition and use of *whom* and of nominative pronouns in conjoined noun phrases, which are considered to be the clearest examples of forms produced by grammatical viruses. In Chapter 3, I discuss what types of generalizations can legitimately be made about grammatical viruses, including where they can apply, how grammatical virus rules should be stated, and what properties are truly typical of

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them. Then in Chapter 4, I consider the possibility of virus analyses of plural agreement in expletive constructions, preposition pied piping, and subjunctive *were* in clauses introduced by *if*. The latter is newly proposed as a possible grammatical virus, and is exemplified in (47).

(47) a. If Ryan were rich, he would build wood furniture all day.
     b. I wondered if he were serious about that.

The data on the acquisition and use of these constructions are compared to the pattern established for the *whom* and nominative pronoun viruses. The possible ways to state appropriate virus rules and the presence of the the typical properties of grammatical viruses are also considered. These results are used toin order to determine whether it is correct to give these constructions a virus analysis.

1.5. Implications for linguistic theory

Investigation of grammatical viruses is essential to linguistic theory for a number of reasons. The most important reason is that we must be able to recognize when grammatical viruses are at work so that we do not mistakenly try to account for their effects with modifications to theories of grammar. For example, it would be misguided to complicate Case theory to account for the distribution of *whom*, if the correct account is outside of Case theory and, in fact, outside of the grammar altogether. On the other hand, if grammatical viruses are known to exist, but are not precisely characterized, there is a risk that unexplained phenomena will routinely be banished from the realm of the grammar and attributed to grammatical viruses, even when this is not the correct analysis.

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Sobin (1994a) discusses this issue in the following way: It is well known that in using speakers' intuitions in formulating grammatical theory, we often must abstract away from the crucial distinction between grammaticality and acceptability. The divergence of these two concepts has received the most attention in cases where a given sentence is believed to be grammatical but is considered unacceptable by speakers. This situation arises because the sentences that a speaker utters, or those that he or she judges acceptable are filtered not only through the grammar, but also through performance systems. For example, (44) is a grammatical sentence that speakers frequently judge as unacceptable.

(44) The horse raced past the barn fell.

This can be taken to be an effect of a performance system that must parse sentences, keeping track of all their elements. An ambiguity is introduced in the first three words of (44), and the parser tends to resolve it by analyzing *raced* as a matrix verb. The completion of the sentence is incompatible with this analysis, causing speakers to initially report that the sentence is unacceptable.

As Sobin (1994a) points out, a possibility that has received less attention is that grammaticality and acceptability may diverge in the other direction. That is, there may be sentences that are acceptable to native speakers, despite their ungrammaticality. According to Sobin's view of the way grammatical viruses work, they create sentences that fit just this description. As discussed above, this possibility is important to recognize when collecting data and formulating linguistic theory; linguistic theory must be able to distinguish between

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acceptances that directly reflect the grammar and those that do not. (See Braze (2002); Hiramatsu (2000); Cowart (1997) on grammaticality versus acceptability.)

Grammatical viruses are of special interest in a Minimalist framework because they will produce apparent optionality (see McDaniel et al. 1998). One of the themes in Minimalist analyses has been that operations occur only when they must occur. If this assumption is adopted, then what looks like optionality must be explained in some other way. The explanation offered by virus theory is that one option is produced by the grammar, the other by a grammatical virus. For example, consider (45):

(45) a. We feed children who we think are hungry.
    b. We feed children whom we think are hungry.

If *whom* is a regular accusative pronoun, with its Case checked by the normal Case-checking mechanism, then it is not clear why either a nominative form or an accusative form can have its Case checked in the same position in (45). If *whom* is licensed by a grammatical virus, then this puzzle is solved; *who* is allowed in (45a) by the grammar, and *whom* is allowed in (45b) by the virus.[7]

From a language acquisition perspective, an understanding of grammatical viruses is important in determining the significance of children's production and

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[7] Of course, not all instances of apparent optionality will receive a virus analysis. Even within the Case system, we may find instances of apparent optionality that do not call for a virus analysis. Howard Lasnik pointed out to me the followng Case alternation in Korean.
(i) John-un   Mary-ka   papo-la-ko   mitnun-ta
    John-TOP Mary-NOM fool-be-COMP believe
    'John believes Mary to be a fool.'
(ii) John-un   Mary-lul   papo-la-ko   mitnun-ta
    John-TOP Mary-ACC fool-be-COMP believe
    'John believes Mary to be a fool.'
To the best of my knowledge, there is no reason to believe that either of these options is the result of a grammatical virus.

acceptance of certain forms throughout development. Little is known about the extent to which young children receive virus input and what effect such input has on their production and acceptance of virus forms. Lasnik and Sobin (2000) claim that the use of *whom* is not characteristic of the speech of young children. McDaniel, McKee and Bernstein (1998) even use children's low rate of acceptance of preposition pied piping as an argument that preposition pied piping in English is caused by a grammatical virus. Yet prior to the research reported in this dissertation, formal studies of young children's use and acceptance of virus forms like *whom* and nominative pronouns in conjoined noun phrases did not exist. Studies on how grammatical viruses affect speakers throughout language development will shed light on an area where age (as well as education, and other factors) may result in a difference in observed linguistic data among speakers, although no relevant difference in grammar exists.

The picture of grammatical viruses painted by Sobin (1997) and Lasnik and Sobin (2000) also provides an interesting challenge for the idea that the grammar is informationally encapsulated. Recall that Sobin (1997) states that "a grammatical virus is a device that can read grammatical structure and affect it, though it is grammar-external" (319). Accordingly, in characterizing the virus that allows *whom* in English, Lasnik and Sobin (2000) propose an extra-grammatical rule that checks accusative Case. This seems to be exactly what would not be allowed by a grammar that was informationally encapsulated, in the sense of Fodor (1983). I will argue that the correct formulation of grammatical viruses

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does not read grammatical structure, maintaining the idea that interaction between

the grammar and other cognitive modules is shallow.

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Chapter 2. The Base Cases: *Whom* and nominative pronouns

2.1. Introduction

There is, potentially, a wealth of information about grammatical viruses to be found in data concerning their use and acceptance by speakers. By observing speakers in different stages of linguistic and educational development, we can more fully understand how grammatical viruses emerge in speakers. We can also look for patterns in use and acceptance to which we can compare other proposed grammatical viruses.

There are three prior studies that provide empirical data for possible grammatical virus forms. The earliest of these is Quattlebaum (1994). Quattlebaum's aim was to test Emonds' (1986) suggestion that in teaching prestige usages, the best method is one that clearly contrasts prestige usage with normal usage, admitting to the "unnatural" character of the prestige usage. She administered a written test in which high school students were given sentences where they could choose either a nominative or an accusative pronoun. The subjects were supposed to choose what they believed to be the prestige usage. Then, one group of subjects was taught about prestige usage with a "linguistic method," conforming to Emonds' suggestions, while the other group was taught with traditional methods. Each group then took the same written test again. The post-test confirmed that the linguistic teaching method was more effective than

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the traditional one. In addition, both the pre-test and the post-test supply some valuable information about speakers' behavior with respect to nominative pronoun viruses, to be discussed in later sections. However, the goals of Quattlebaum's study led her to limit it to a single age group, and so we cannot obtain from it any information about the development of speakers' behavior from early childhood. Also, recall that Quattlebaum's subjects were asked to select pronouns that reflected prestige usage. Again, while this was wholly appropriate given her aims, it leaves unanswered a question that is highly relevant for linguistic study. That question is how grammatical viruses will affect speakers responses in linguistic tasks when they are asked to identify natural – not prestige – language patterns. This is, of course, what linguists most frequently want speakers to do when collecting judgment data for use in developing linguistic theory.

The second study to look empirically at a proposed grammatical virus is Sobin (1997). Sobin proposes that plural agreement in ECs ((48a)) is caused by a grammatical virus, and that singular agreement ((48b)) is the only grammatical option.

(48) a. There are pencils in the box.
    b. There is pencils in the box.

In the empirical study, subjects were asked to judge the naturalness of ECs with plural and singular verbs and plural and singular associates of various types. Sobin uses the results to argue that plural agreement in ECs displays the properties he expects of a grammatical virus, which were discussed in Section

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1.3.3. In Section 4.1, I discuss the results and implications of Sobin's study. Sobin's subjects, like Quattlebaum's, fall into a single age group.

The last relevant empirical study is that of McDaniel, McKee and Bernstein (1998). These authors consider the possibility that preposition pied-piping in English ((49)) is caused by a grammatical virus.

(49) That is the pen with which I wrote.

They present elicited production and acceptability judgment data from subjects ages 3;5 to 11;11, as well as adults . They find that subjects of all ages fail to produce preposition pied-piping in the elicited production task, and that, in the acceptability judgment task, young children largely reject preposition pied piping, with acceptance increasing with age. They take these findings to support a grammatical virus analysis of preposition pied piping in English relative clauses. Despite the intuitive appeal of their argument, it is far from conclusive without the existence of other data showing us whether grammatical viruses typically produce such a pattern of results.

In this chapter, I present the empirical data I have collected concerning acceptance and use of the word *whom* and of nominative pronouns in conjoined noun phrases. I take both of these to be paradigmatic cases of grammatical virus phenomena; Sobin (1997) and Lasnik and Sobin (2000) have made convincing cases against analyzing them as part of the grammar. Their acceptance and use by children and adults are examined to determine whether patterns exist which can be used to better understand how grammatical viruses affect speakers thoughout development and to evaluate other proposed grammatical viruses.

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2.2. Spontaneous speech study 1: Whom in child and adult speech

2.2.1. Goal

The goal of this study is to determine whether young children and adults use *whom* or its non-virus alternative, *who*, in spontaneous speech. The child and adult speech both come from transcripts in the CHILDES database (MacWhinney 2000); therefore, much of the adult speech is child-directed. Although it is unlikely that children before school age receive instruction on the use of *whom*, to the extent that *whom* is present in the language input available to them, there is a possibility of it appearing in their production.

2.2.2. Method

All uses of the word *whom* were extracted from all speaker tiers from the following ten corpora, available on the CHILDES database: Adam (Brown 1973), Allison (Bloom 1973), April (Higginson 1985), Eve (Brown 1973), Naomi (Sachs 1983), Nathaniel (Snow, in MacWhinney 2000), Nina (Suppes 1974), Peter (Bloom, et al. 1974; Bloom, et al. 1975), Sarah (Brown 1973) and Shem (Clark 1978). All uses of the non-virus alternative, *who*, were also extracted. These were then hand-coded for whether they were child or adult utterances and for whether they appeared in a nominative position, an accusative position, or an unknown position.[8]

The ten corpora include the numbers of sessions and age ranges reported in Table 2.

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Corpus	Number of sessions	Age range of target child
Adam	55	2;3.4-4;10.0
Allison	6	1;4.21-2;10.0
April	6	1;10.0-2;11.0
Eve	20	1;6.0-2;3.0
Naomi	93	1;2.29-4;9.3
Nathaniel	30	2;5.18-3;9.4
Nina	52	1;11.16-3;3.21
Peter	20	1;9.8-3;1.20
Sarah	137	2;3.19-5;1.6
Shem	40	2;2.16-3;2.2

Table 2   Corpora used in spontaneous speech analysis

Note that the results from different corpora are not meant to be compared against one another, as they come from different numbers of sessions and children of different ages.

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[8] For example, in the utterance *Who?*, the word *who* is considered to be in an unknown position.

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2.2.3. Results

Table 3 shows the number of instances of *whom* found in each corpus.

Corpus	Adult Nom.	Adult Acc.	Adult Un-known	Adult Total	Child Nom.	Child Acc.	Child Un-known	Child Total
Adam	0	11	0	11	0	1	0	1
Allison	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0
Eve	0	0	0	0	0	0	0	0
Naomi	0	0	0	0	0	0	0	0
Nathaniel	0	1	0	1	0	0	0	0
Nina	0	31	0	31	0	0	0	0
Peter	0	1	0	1	0	0	0	0
Sarah	0	4	0	4	0	0	0	0
Shem	0	1	0	1	0	0	0	0
Total	0	49	0	49	0	1	0	1

Table 3   Uses of *whom* in CHILDES corpora

Some corpora had no instances of *whom* at all. Below are some examples of the adult utterances that were found using *whom*:

(50) MOT: whom did you kick with your shoe ?   (Adam 10, line 551)

(51) KAT: tell your mother to whom you talked on the phone last night.
                                                                    (Nathaniel 16, line 1016)

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No corpus had any instance of *whom* in a nominative position, although this would be allowed by Lasnik and Sobin's (2000) extended *whom* rule, in sentences such as (36a), repeated below.

(36) a. We feed children whom we think are hungry.

There was only one instance of a child utterance using *whom*, in the Adam corpus; upon examination, this was found to be a repetition of an adult utterance.

Table 4 gives the number of instances of *who* in each corpus.

Corpus	Adult Nom.	Adult Acc.	Adult Un-known	Adult Total	Child Nom.	Child Acc.	Child Un-known	Child Total
Adam	119	83	56	258	135	40	257	432
Allison	12	3	2	17	0	0	0	0
April	12	24	8	44	11	2	3	16
Eve	35	44	35	114	4	3	2	9
Naomi	28	21	16	0	29	3	3	35
Nathaniel	70	48	28	146	4	6	31	41
Nina	291	222	37	550	51	19	36	106
Peter	103	61	60	224	24	13	15	52
Sarah	257	128	163	548	60	31	53	144
Shem	86	64	16	166	17	8	6	31
Total	1013	698	421	2132	335	125	406	866

Table 4   Uses of *who* in CHILDES corpora

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Adults used *who* in nominative and accusative positions in every corpus, and all but one child used *who* in his or her corpus. Any child who used *who* used it in both nominative and accusative positions. Adults and children used it robustly in both Case positions.

2.2.4. Discussion

It is clear from the high number of uses in Table 4 that the grammar of English permits *who* to be used in both accusative and nominative positions. Only one child failed to use *who* in her corpus, and that was Allison. This may be attributed to the facts that Allison's corpus consists of only six transcripts, and in her last transcript, Allison's age is 2;10.0, the youngest of any child in his or her last transcript.

In comparison, *whom* was used much less regularly than *who*. Only some adults used *whom* in some of their object questions. This reflects a property of grammatical viruses that separates them from grammatical rules: They do not need to apply consistently. The fact that no adult produced *whom* in what prescriptivists would consider a hypercorrection, as in (36a), may be due to the rarity of such constructions, which involve long distance movement from a subject position. For comparison, only two of the *whom* sentences produced involved any type of long distance movement.

As noted above, no child produced *whom* in a novel utterance; the one child use of *whom* was a repetition. I will postpone discussion of the significance of this fact until results from the acceptability judgment task have been presented.

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2.3. Spontaneous Speech Study 2: Nominative pronouns in conjoined NPs in child and adult speech

2.3.1. Method

All uses of singular nominative first and third person pronouns (*I, he, she*) immediately preceding or immediately following the word *and* were extracted from the same ten CHILDES corpora listed in Section 2.3.1. In addition, all uses of singular accusative (or default) first and third person pronouns (*me, him, her*) in these same positions were extracted. The extracted utterances were then examined by hand to find only those utterances in which the pronoun was part of a conjoined noun phrase.[9] The remaining utterances were hand-coded for whether the pronoun was first person or third person, whether the utterance was an adult utterance or a child utterance and for whether the conjoined noun phrase appeared in a nominative position, an accusative position, or without enough surrounding material to determine. A position was considered a nominative/accusative position if a simple, non-conjoined pronoun would have nominative/accusative Case in that position. Since Sobin has made convincing arguments the existence of separate virus rules for first and third person nominative pronouns in conjoined noun phrases, these will be examined individually.

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[9] This was done to exclude from the analysis sentences like (i), in which *and he* is not part of a conjoined noun phrase.
(i) He opened the book and he read the first page.

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2.3.2. First person pronouns

2.3.2.1. Results

Table 5 gives the number of instances of the singular first person nominative pronoun, *I*, following *and* in a conjoined noun phrase in each corpus.

Corpus	Adult Nom.	Adult Acc.	Adult Un- known	Adult Total	Child Nom.	Child Acc.	Child Un- known	Child Total
Adam	0	0	1	1	4	0	1	5
Allison	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0
Eve	1	0	1	2	2	0	0	2
Naomi	2	0	0	2	0	0	0	0
Nathaniel	5	0	1	6	0	0	0	0
Nina	2	0	0	2	0	0	0	0
Peter	11	0	0	11	0	0	0	0
Sarah	9	0	0	9	0	0	0	0
Shem	6	0	0	6	0	0	0	0
Total	36	0	3	39	6	0	1	7

Table 5   Uses of 'NP *and I*' in CHILDES corpora

Adults used *I* as a second conjunct in eight out of ten corpora. These uses were always in nominative or unknown positions. For example, (52) is one of the adult utterances found with "NP *and I*" in nominative position.

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(52) PAT: Lynn and I brought some toys too.   (Peter 15, line 97)

As for the children, there were seven uses of *I* following *and*, from two different children. Five of these uses come from Adam, with Adam's four uses in nominative positions occurring in the same transcript. (53) and (54) are examples of child utterances using "NP *and I*."

(53) CHI: Mommy # you and I are fixing this . (Adam 41, line 264)

(54) CHI: you and I have grape juice .   (Eve 17, line 111)

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In Table 6 are the instances of *I* preceding *and* in a conjoined noun phrase in each corpus.

Corpus	Adult Nom.	Adult Acc.	Adult Un-known	Adult Total	Child Nom.	Child Acc.	Child Un-known	Child Total
Adam	0	0	0	0	0	0	0	0
Allison	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0
Eve	0	0	0	0	0	0	0	0
Naomi	0	0	0	0	0	0	0	0
Nathaniel	0	0	0	0	0	0	0	0
Nina	0	0	1	1	1	0	0	1
Peter	0	0	0	0	0	0	0	0
Sarah	0	0	0	0	0	0	0	0
Shem	0	0	0	0	1	0	0	1
Total	0	0	1	1	2	0	0	2

Table 6   Uses of '*I and* NP' in CHILDES corpora

There was only one adult use of *I* preceding *and*; however, *I* also followed *and* in this utterance, which is given in (55).

(55) *MOT: hey # turtle # Nina and I and lawny and barbara and joe and rob we

all went for a long hike and we saw some animals .   (Nina 42, line 1113)

There were two child uses of *I* preceding *and*, both in nominative positions. These are given below.

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(56) CHI: i and me bom(p) myshelf .   (Shem 13, line 35)

(57) CHI: I and Miriam are gonna make some icecream cones .

(Nina 55, line 984)

Table 7 gives the uses of *me* following *and* in the ten corpora.

Corpus	Adult Nom.	Adult Acc.	Adult Un-known	Adult Total	Child Nom.	Child Acc.	Child Un-known	Child Total
Adam	0	0	0	0	0	4	1	5
Allison	0	0	0	0	0	0	0	0
April	0	0	0	0	1	0	0	1
Eve	0	0	0	0	0	0	2	2
Naomi	0	0	0	0	0	3	0	3
Nathaniel	0	2	1	3	0	0	0	0
Nina	0	0	0	0	1	5	3	9
Peter	0	1	0	1	0	0	0	0
Sarah	0	1	1	2	0	1	6	7
Shem	2	3	4	9	1	4	7	12
Total	2	7	6	15	3	17	19	39

Table 7   Uses of 'NP *and me*' in CHILDES corpora

Adults used *me* as a second conjunct in four of the ten corpora. These uses included two in nominative positions and seven in accusative positions. Examples of each of these are given below.

(58) INV: now # we have to go through all these and find out if we can find the ones that you and me both need .   (Shem 20, line 708)

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(59) LOI: are you gonna make coffee for Patsy and me ?   (Peter 8, line 2931)

Children used *me* as a second conjunct in seven corpora, including three uses in nominative positions and seventeen in accusative positions. Again, examples of each are provided.

(60) CHI: Grandma and me went bump .   (April 5, line 1503)

(61) CHI: and United States will be close to you and me .   (Naomi 92, line 917)

In Table 8 are numbers of uses of *me* as a first conjunct.

Corpus	Adult Nom.	Adult Acc.	Adult Un-known	Adult Total	Child Nom.	Child Acc.	Child Un-known	Child Total
Adam	0	0	0	0	10	9	4	23
Allison	0	0	0	0	0	0	0	0
April	0	1	0	1	0	0	0	0
Eve	0	0	2	2	2	0	1	3
Naomi	0	0	0	0	0	0	0	0
Nathaniel	0	0	0	0	0	0	0	0
Nina	0	0	0	0	0	1	4	5
Peter	0	1	1	2	0	0	2	2
Sarah	0	1	2	3	0	0	0	0
Shem	1	0	1	2	1	2	1	4
Total	1	3	6	10	13	12	12	37

Table 8   Uses of '*me and* NP' in CHILDES corpora

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Adults used *me* as a first conjunct in five out of ten corpora. These uses included one in nominative position and three in accusative positions. Children in five corpora used *me* as a first conjunct, including thirteen instances in nominative positions and twelve in accusative positions. Examples of adult ((62)-(63)) and child ((64)-(65)) utterances in each position are given below.

(62) INV: and then you and me and Robin can play a game .

(Shem 35, line 407)

(63) MOT: you # with me (a)n(d) Daddy .   (Sarah 59, line 726)

(64) CHI: and me an(d) Papa buy some salt .   (Eve 19, line 1130)

(65) CHI: you play with me and Mommy .   (Adam 32, line 393)

2.3.2.2. Discussion

Overall, the number of conjoined noun phrases with pronouns that were found is quite small. Nevertheless, the results in Table 7 and Table 8 are consistent with the hypothesis that the pronoun *me* can grammatically appear as a first or second conjunct, either in positions in which non-conjoined NPs would have nominative case or in those in which non-conjoined NPs would have accusative case. In total, adults used *me* in conjoined noun phrases three times in nominative positions and ten times in accusative positions. Children also used accusative pronouns in conjoined noun phrases: sixteen times in nominative positions and 29 times in accusative positions.

Adults used *I* as a second conjunct 36 times in nominative positions, but never in accusative positions. Adults also never used *I* before *and*, except in the example discussed above, in which *and* preceded and followed *I*. If one accepts

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Sobin's (1997) position that *I* as a second conjunct is licensed by a virus that is insensitive to grammatical position, it may seem surprising that adults used "NP *and I*" in nominative positions, but never in accusative positions. Note, however, that the adults only used conjoined NPs with at least one pronoun seven times in accusative positions, compared with 52 times in nominative positions. Thus, the absence of nominative pronouns in accusative positions in the adult data may be a reflection of the small number of opportunities to use the construction.

Children used nominative pronouns as first or second conjuncts very rarely. As noted above, among eleven total child uses in ten corpora, four of them came from one child on one day. In this respect, spontaneous use of *I* in conjoined noun phrases is similar to spontaneous use of *whom*: Neither seems to be very productive for young children.

In another respect, spontaneous use of *I* in conjoined noun phrases is different from spontaneous use of *whom*. Recall that even adults who used *whom* in their spontaneous speech used *who* far more frequently. For example, Nina's was the corpus with the most adult uses of *whom* in accusative positions, with 31 uses. This corpus also contained 222 adult uses of *who* in accusative positions. The presence of the grammatical virus does not suppress the spontaneous use of the virus' grammatical alternative. On the other hand, the grammatical virus allowing *I* as a second conjunct seems to co-occur with a low rate of use of *me* as a second conjunct. Adults in the Peter and Sarah corpora used *I* in conjoined noun phrases eleven and nine times, respectively, and they used *me* in conjoined noun phrases only three and five times, respectively. In contrast, the children in those

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transcripts never used *I* in conjoined noun phrases, and they used *me* in conjoined

noun phrases two and seven times, respectively.

2.3.3. Third person pronouns

2.3.3.1. Results

Uses of the singular third person nominative pronouns, *she* and *he*,

following *and* are given in Table 9.

Corpus	Adult Nom.	Adult Acc.	Adult Un-known	Adult Total	Child Nom.	Child Acc.	Child Un-known	Child Total
Adam	0	0	0	0	0	0	0	0
Allison	0	0	0	0	0	0	0	0
April	0	0	0	0	1	0	0	1
Eve	0	0	0	0	0	0	0	0
Naomi	0	0	0	0	0	0	0	0
Nathaniel	0	0	0	0	0	0	0	0
Nina	0	0	0	0	0	0	0	0
Peter	0	0	0	0	0	0	0	0
Sarah	1	0	0	1	0	0	0	0
Shem	0	0	0	0	0	0	0	0
Total	1	0	0	1	1	0	0	1

Table 9   Uses of 'NP *and she/he*' in CHILDES corpora

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Uses of the pronouns *she* and *he* following *and* were very rare, with only one

adult use and one child use (both in nominative positions). The child utterance is

given in (63). The one adult use is appears to be an instance of expansion upon a

child's previous utterance; the exchange is given in (66).

(66) CHI: Peter and he see Roy .   (April 3, line 1895)

(67) CHI: he se@ talking.
     MOT: yeah # he and she can talk.   (Sarah 47, line 639)

Table 10 gives the uses of *he* and *she* preceding *and*.

Corpus	Adult Nom.	Adult Acc.	Adult Un-known	Adult Total	Child Nom.	Child Acc.	Child Un-known	Child Total
Adam	0	0	0	0	0	0	0	0
Allison	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0
Eve	0	0	0	0	0	0	0	0
Naomi	0	0	0	0	0	0	0	0
Nathaniel	1	0	0	1	0	0	0	0
Nina	0	0	0	0	0	0	1	1
Peter	2	0	0	2	0	0	0	0
Sarah	2	0	0	2	0	0	0	0
Shem	1	0	0	1	0	0	0	0
Total	6	0	0	6	0	0	1	1

Table 10   Uses of '*he/she and* NP' in CHILDES corpora

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Again, the numbers are quite small, although adults used *he* and *she* more before *and* than after *and*. Adults used *she* or *he* before *and* in four of the ten corpora, and only in nominative positions. An example of an adult utterance is given in (68). There was only one child use, in an unknown position, and this is given in (69).

(68) KAT: somebody she met in when she and another friend of ours went to Florida together .   (Nathaniel 16, line 1266)

(69) CHI: he and his daddy .   (Nina 56, line 1151)

In Table 11 are uses of the singular third person accusative/default pronouns, *her* and *him*, following *and*.

Corpus	Adult Nom.	Adult Acc.	Adult Un-known	Adult Total	Child Nom.	Child Acc.	Child Un-known	Child Total
Adam	0	0	0	0	1	0	0	1
Allison	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0
Eve	0	0	0	0	0	0	0	0
Naomi	0	0	0	0	0	0	0	0
Nathaniel	0	0	0	0	0	0	0	0
Nina	0	0	0	0	0	0	0	0
Peter	0	0	0	0	0	0	0	0
Sarah	0	0	0	0	0	1	1	2
Shem	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	1	1	3

Table 11   Uses of 'NP *and her/him*' in CHILDES corpora

Adults never used *her* or *him* following *and*. Children did so in only three instances, including once in a nominative position and once in an accusative position, which are given below:

(70) CHI: me and him are drum makers .   (Adam 48, line 595)

(71) CHI: a boy likes the alligator and her .   (Sarah 139, line 1057)

Finally, Table 12 gives numbers of uses of *her* or *him* preceding *and*.

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Corpus	Adult Nom.	Adult Acc.	Adult Un-known	Adult Total	Child Nom.	Child Acc.	Child Un-known	Child Total
Adam	0	0	0	0	0	0	0	0
Allison	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0
Eve	0	0	0	0	0	0	0	0
Naomi	0	0	0	0	0	0	0	0
Nathaniel	0	0	0	0	0	0	0	0
Nina	0	0	0	0	0	0	0	0
Peter	0	0	0	0	0	0	0	0
Sarah	2	0	3	5	0	0	0	0
Shem	1	0	0	1	0	0	0	0
Total	3	0	3	6	0	0	0	0

Table 12   Uses of 'her/him and NP' in CHILDES corpora

Adults used *him* or *her* before *and* six times. Three of those, such as (72)

below, were in nominative positions. There were no instances of children using

him or *her* before *and*.

(72) INV: the lion's bowl can go over here buh [//] so (1)him (1)and the bunny
can share it # an(d) this bowl can go here an(d) these three can share it .

(Shem 33, line 988)

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2.3.3.2. Discussion

The results reported in Section 2.3.3.1 include very few uses of third person singular pronouns in conjoined noun phrases. However, they are consistent with Sobin's (1997) view that the pronouns *her* and *him* can grammatically appear in conjoined noun phrases in nominative positions; of the nine total uses of these pronouns in conjoined noun phrases, 4 of them (or 44%) were in nominative positions. Although there was only one instance of *him* or *her* appearing in a conjoined noun phrase in an accusative position, it is generally undisputed that such a use is possible and grammatical. I conclude that Sobin (1997) is correct: *Him* and *her* are grammatical in conjoined noun phrases in both nominative and accusative positions.

As for *he* and *she* in conjoined noun phrases, the data is consistent with both of Sobin's (1997) observations from Quattlebaum's (1994). First, adults are more likely to use these pronouns before *and* (six times) than after *and* (once; and see discussion of example (66)). Sobin's second observation was that adults are more likely to accept *he* and *she* in coordinated noun phrases in nominative positions than in accusative positions. While it is true that the data reported here include seven such uses in nominative positions and none in accusative positions, there were, in fact, no adult uses of any third person singular pronoun in coordinated noun phrases in accusative positions. Thus, the data are consistent with, but do not confirm Sobin's observation that *"he/she and..."* is more acceptable in nominative than accusative positions.

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As with *whom* and *I* in conjoined noun phrases, it is quite rare for children to use *he* or *she* in conjoined noun phrases. There are only two such examples in the ten corpora. In Section 2.3.2.2, I observed that while use of *whom* does not co-occur with decreased use of *who*, use of *I* in conjoined noun phrases does seem to co-occur with decreased use of *me* in conjoined noun phrases. It is difficult to say which way use of *he/she* in conjoined noun phrases patterns, since there are so few uses of third person pronouns in conjoined noun phrases at all.

2.4. Summary: Grammatical viruses in spontaneous speech

The findings of Sections 2.2 and 2.3 lead to the following generalizations about grammatical viruses in spontaneous speech:

- The virus form has a grammatical counterpart that is used in spontaneous speech by both children and adults.

- The virus form is sometimes used by adults. Its frequency with respect to the grammatical form may vary.

Adults use *whom* far less then they use *who*; however, they use *I* as a conjunct more than they use *me*.

- Children do not make frequent use of virus forms, although they may use them rarely.

It is notable that, of the viruses studied in Sections 2.2 and 2.3, the one children use the most is the *"and I"* virus. The *"and I"* virus is exceptional in two ways: It has an effect of decreasing use of grammatical alternatives, and

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children use it more frequently than they use other viruses (although their use of it is still rare).

2.5. Experiment 1: Whom in acceptability judgments

2.5.1. Introduction

Besides finding out about use of grammatical viruses in spontaneous speech, it is important to find out how subjects of various ages will respond in acceptability judgment tasks that involve virus forms and their grammatical alternatives. It is widely recognized that the failure to produce a particular form or structure spontaneously does not imply a lack of linguistic knowledge on the part of the speaker. Even young children, who produce virus forms very infrequently, may have knowledge of them that will affect their acceptability judgments. Furthermore, it is not clear how adults will respond to virus forms. Hiramatsu and Lillo-Martin (1998) show that sometimes subjects (in their case, children) will judge unacceptable the very type of sentence that they have produced. We cannot, therefore, assume that adults who produce virus forms will accept those same forms in acceptability judgment tasks.

Understanding speakers' behavior in this type of task is highly relevant for linguists who use acceptability judgments in creating and testing theories. When a linguist collects acceptability judgments, a usual goal is to find out which linguistic structures and forms the speaker's grammar can generate. Given this goal, it is important to recognize cases in which a speaker's acceptance in a judgment task does not correlate with possible generation by the speaker's

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grammar. We will see that grammatical viruses and speakers' attitudes about prestige language can have this effect in two ways: The speaker may accept a virus form that is not generated by the grammar alone, or the speaker may reject a grammatical alternative. Since grammatical viruses can mask the grammar in these ways, it is crucial to be able to identify them. I will consider the possibility that there are patterns in the acceptability judgments themselves that can be used to help identify other cases in which grammatical viruses affect behavior on judgment tasks.

In this experiment, I collected acceptability judgments from subjects in five different age groups on sentences containing *whom* in various positions. The hypotheses to be tested are:

- Subjects will accept *whom* sentences at a different rate in virus vs. non-virus contexts (as opposed to prescriptively correct vs. prescriptively incorrect contexts).

- There will be an effect of age group on the acceptance of *whom* sentences.

In addition to *whom* sentences, subjects also judged similar sentences with *who*. The results will help us to see whether a grammatical virus for *whom* affects speakers' judgments of its non-prestige counterpart.

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2.5.2. Method

2.5.2.1.Subjects

Grammatical viruses are a response to prestige language input. One way of transmitting prestige language input is through schooling, whether through formal instruction, or a style of speaking used more frequently in school than at home. Accordingly, we may expect to see grammatical viruses affect speakers differently depending on current (or past) educational level. The 72 subjects for this task came from five groups, divided by educational level at the time of testing, as described in Table 13.

Number of subjects	Group name	Age range	Mean age
14	Kindergarten	4;9-6;0	5;6
13	Elementary	6;4-9;5	8;0
15	Middle	11;3-14;2	12;8
15	High	16;1-18;4	17;11
15	College	18;0-23;0	20;10

Table 13   Subjects for acceptability judgment experiments

At the time the experiment was conducted, all subjects were enrolled in school at the indicated level in northeastern Connecticut. Kindergarten through high school subjects were recruited through their teachers or program directors, and college subjects were recruited through advertisements at the University of Connecticut, Storrs campus. Compensation was provided for high school subjects ($5) and for

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college subjects ($8). Kindergarten, elementary school and middle school subjects were not compensated.

2.5.2.2. Procedure

The subjects participated in an acceptability judgment task, as described by Hiramatsu and Lillo-Martin (1998). In each session, one subject worked with two experimenters. The subject was introduced to a monkey puppet, named Harold, who was controlled by one of the experimenters, and asked to help Harold learn English by telling him when he made mistakes. Subjects indicated their responses by feeding the puppet one of two foods: a leaf of lettuce if he made a mistake, or a donut if he said something the right way.

The explanations to the subjects were slightly different for the youngest two age groups versus the older age groups. Although the goal was for all subjects to perform the same task, differences in educational level required slightly different explanations to accomplish this goal. For the kindergarten and elementary school subjects, the explanation went something like this:

> This is Harold. He's a very special monkey because he's trying to learn to speak English, like you do. Just like anyone who learns a new language, Harold makes some mistakes. Your job is to tell him when he makes mistakes and when he says something the right way. So if Harold says something that sounds silly, and he's not talking the way people talk, you feed him this lettuce, which is healthy and makes him smarter. But if he does a good job, and talks like other people you know, then he gets his favorite treat, the donut.

Middle school, high school, and college subjects were given similar explanations, but were also told not to concentrate on prescriptive grammar:

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Some of the things Harold says might remind you of grammar lessons from your English classes. We are not testing you on grammar rules, though, and you don't need to remember them. If what Harold says is a possible way for people to talk, no matter what your teacher might say, then he's right, and he gets the donut. But if he says something in a way that's just not possible, then he's made a mistake and he gets the lettuce.

This sort of explanation was designed to encourage subjects to accept both colloquial forms that are permitted by the grammar and prescriptive forms and hypercorrections that are licensed by grammatical viruses. If subjects were simply asked to tell Harold whether or not he was right, some subjects may have looked only for prescriptively correct forms, rejecting colloquial forms. Conversely, if subjects were asked to tell Harold whether or not he sounded natural, they might have rejected all virus-produced forms, as they are inherently less natural than grammatical forms for most speakers. The explanation provided was meant not only to avoid these problems, but also to encourage subjects to base their responses on the same criteria, as much as possible. For kindergarten and elementary school students, the issue of prescriptive teaching did not arise, since instruction in the relevant area had not yet begun.

After the subject had been given the instructions, a training session was conducted. For kindergarten students, the training session began with judging words. In some of the puppet's sentences, words were mispronounced, as in the training sentence *You go to blindergarten*. Once the subject was consistently rejecting sentences with mispronounced words, the puppet began making sentence level errors. For older subjects, the training began at this point. Examples of mistakes the puppet made during this portion of the training include *I like that*

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shirt you wearing are, My mother made I a chocolate cake, and *I opened mine*

presents. Subjects had to correctly judge several training sentences in a row,

including both grammatical and ungrammatical examples, before proceeding to

the experimental portion. In addition, all subjects had to correctly reject the Case

error in either the second or the third sentence given above. This ensured that

subjects were sensitive to use of incorrect Case forms.[10]

In the experimental portion of the sessions, one experimenter told stories,

which were acted out using toys. When the story was done, Harold, controlled by

the other experimenter, made statements about the story.[11] After each statement,

the subject fed Harold either the lettuce leaf, if he had made a mistake, or the

donut, if he had not made a mistake. The subjects were encouraged to ask

questions about the task, if they had any. They were also permitted to ask Harold

to repeat sentences that they wanted to hear again before giving a response.[12]

Between the stories, Harold chatted with the subjects, providing filler items to

make sure the subjects were still attending to the task. When subjects had given

several "no" responses in a row, they were given grammatical filler items, and

when subjects had given several "yes" responses in a row, they were given

ungrammatical filler items. The experiment was not continued with subjects who

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[10] As discussed in Section 2.6.4, some young children accept *I* in place of *me*, seemingly indiscriminately. Thus, a child who accepted the training sentence *My mother made I a chocolate cake* was permitted to continue with the experiment if he or she correctly rejected *I opened mine presents.*

[11] For seven of the 72 subjects, one experimenter both told the stories and controlled Harold. This did not have a negative effect on subjects' ability to pass the training, and subjects did not appear confused by the experimenter's dual roles.

[12] Although subjects were encouraged not to dwell on particular test sentences or to consciously reference prescriptive rules, their judgments were not speeded, and they were permitted to hear test sentences more than once. An interesting topic for future research would be to gather adults'

answered incorrectly on these filler items. All reported data reflects only subjects who successfully completed the training and answered filler items correctly.

After all judgments had been provided, subjects were asked to comment on what kinds of mistakes they remembered Harold making.

2.5.2.3. Materials

The sentences to be judged included sentences using *whom*, and its grammatical counterpart *who* in various sentence positions. There were two tokens for each type of sentence. The full set of test items appear in (73)-(78).

(73) a. I know who built a sandcastle.
　　 b. I forgot who bought a cookie.

(74) a. ! I also know whom went swimming.
　　 b. ! I asked whom taught Jack the spell.

(75) a. David's mom asked who he saw at the party.
　　 b. I asked Big Bird who he believed.

(76) a. Ernie's father asked whom Ernie picked.
　　 b. Carrie wondered whom she should pick.

(77) a. We found birds who we thought were hungry.
　　 b. Bart and Lisa fed a kitten who they thought was hungry.

(78) a. They invited kids whom they thought were nice.
　　 b. The teacher picked the students whom she thought were well-behaved.

Throughout, *whom* was used only in embedded sentences, which were more felicitous than matrix questions, given the experimental procedure, described in Section 2.5.2.2.

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speeded acceptability judgments to try to separate the effects of grammatical viruses from subjects' conscious ideas about prescriptive rules.

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In (73)-(74), the question words originate in subject positions. According to Lasnik and Sobin (2000), (74a,b) are catchers, and neither of their virus rules for *whom* licenses it in this position. Recall that for Lasnik and Sobin, *whom* is made up of the question word *who*, with its own Case feature, and *–m*, which carries an extra accusative Case feature. Their virus rules license *whom* by checking the accusative Case feature of *–m* in certain contexts. The Basic "whom" Rule does not license *whom* in (74) because *who* does not have accusative Case. The Extended "whom" Rule licenses *whom* only when there is no verb of which *whom* is the subject between *whom* and the next NP. In (74a), there is no such NP, and in (74b), the relevant NP, *Jack*, is preceded by *taught*, which has *whom* as its subject.

In (75)-(76), the question words originate in object positions. (76a,b) are slippers for Lasnik and Sobin, and in fact, they can be licensed by either of their rules for *whom*. The Basic "whom" Rule licenses them because, in each sentence, *whom* immediately follows a verb and *who* has accusative Case (having originated as an embedded object). The sentences can also be licensed by the Extended "whom" Rule, since, in each case, *whom* is immediately followed by an NP (and so no verb having *whom* as its subject intervenes between *whom* and the next NP).

In (77)-(78), the question words appear as relative operators moved from subject position. In (78a,b), which Lasnik and Sobin consider to be slippers, *whom* is licensed by the Extended "whom" Rule, since, as in (76), *whom* is immediately followed by an NP. Recall that in these examples, prescriptive

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grammarians do not advocate the use of *whom*, since it originates in subject position.

2.5.3. Results

The results of the acceptability judgment collection on *who* and *whom* sentences are reported in Table 14, which reports the percentage of tokens of each sentence type accepted by each group of subjects. Remember that each subject judged two tokens of each sentence type. Thus, the 86% acceptance of subject *who* by kindergarten subjects represents acceptance of 24 out of 28 (14 kindergarten subjects x 2 tokens) sentences.

Sentence Type	Kinder.	Elem.	Middle	High	College
Subject; *who* Ex. *I know who built a sandcastle.*	86%	85%	93%	100%	100%
Subject; *whom* Ex. *I also know whom went swimming.*	57%	65%	30%	17%	3%
Object; *who* Ex. *David's mom asked who he saw at the party.*	82%	92%	100%	100%	87%
Object; *whom* Ex. *Ernie's father asked whom Ernie picked.*	43%	54%	73%	63%	50%
Embedded subject relative; *who* Ex. *We found birds who we thought were hungry.*	79%	81%	67%	83%	70%
Embedded subject relative; *whom* Ex. *They invited kids whom they thought were nice.*	43%	58%	80%	80%	67%

Table 14 Percentage of tokens of *who* and *whom* sentences accepted

In all subject groups, *who* was accepted at a high rate in embedded subject and embedded object position. In the relative clauses, *who* was accepted at a somewhat lower rate.

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Kindergarten subjects accepted *whom* in embedded subject position 57% of the time, and elementary school students did so 65% of the time. After that, the acceptance rate decreased with educational level, finally reaching an acceptance rate of only 3% at the college level.

In embedded object position, all subject groups accepted *whom* less than they accepted *who*. Kindergarten and elementary school students accepted *whom* 43% and 54% of the time, respectively. Acceptance increased for subjects in middle school and high school, presumably when prescriptive grammar teaching is most intense, and acceptance in the college group lowered again to the 50% level, close to the acceptance rate for the youngest two groups.

Similarly, in the embedded subject relative clauses, the kindergarten and elementary school students accepted *whom* 43% and 58% of the time, respectively. Acceptance increased once again for middle school and high school students, and dropped to 67% for college students. The rate of acceptance of *whom* in this position was lower than the rate of acceptance of *who* for all subject groups except the middle school group.

In section 2.5.1, I presented the following hypotheses to be tested: (i) Subjects will accept *whom* sentences at a different rate in virus vs. non-virus contexts, and (ii) there will be an effect of age group on the acceptance of *whom* sentences. These hypotheses are tested through statistical analysis. For the purposes of the statistical analysis, the *whom* sentences are divided into three sentence types: Correct, Viral, and Other. Correct sentences are those in which it is prescriptively correct to use *whom*—that is, the examples in (76), in which

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whom is extracted from object position. These forms, in addition to being prescriptively correct, are also virus licensed; they meet the requirements of Lasnik and Sobin's (2000) Extended 'whom' Rule. Viral sentences are those in which a virus licenses use of *whom* although its use is prescriptively incorrect. These are the sentences in (78). Other sentences are those in which use of *whom* is neither prescriptively correct nor licensed by a virus—the sentences in (74). The first hypothesis, therefore, amounts to a claim that acceptance of Correct sentences will differ from acceptance of Other sentences and acceptance of Viral sentences will differ from acceptance of Other sentences. (Correct and Viral, but not Other, sentences are virus forms.)

A two-way repeated measures ANOVA was applied to the data for acceptance of *whom* sentences using the SigmaStat software. The two factors were Sentence Type (Correct, Viral, Other) and Age Group (Kindergarten, Elementary, Middle, High, College), with Sentence Type as the one repeated factor. The statistical test found a main effect of Sentence Type ($F[2, 134] = 23.2$, $p < .001$). It did not find a significant main effect of Age Group ($F[4, 67] = 1.5$, $p = .21$), but it did find an interaction effect between Sentence Type and Age Group ($F[8, 134] = 7.7$, $p < .001$).

To further interpret these results, pairwise comparisons were performed by Tukey Test. It was found that there was an overall difference in acceptance between Correct and Other sentences ($p < .001$) and between Viral and Other sentences ($p < .001$). This confirms the first hypothesis, that subjects would distinguish between *whom* in virus contexts and *whom* in non-virus contexts. The

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statistical analysis did not find a significant difference between acceptance of Correct and Viral forms ($p = .15$). This means that subjects did not distinguish between virus contexts in which *whom* was prescriptively correct and those in which it was not.

The Tukey test was also used to investigate the interaction effect between Sentence Type and Age Group. It was found that subjects in the Middle, High, and College age groups differentiated between Correct and Other sentences and between Viral and Other sentences ($p < .001$ for all), while no such distinction was found to be significant for subjects in the Kindergarten and Elementary age groups. These results support the second hypothesis, that there is an effect of age group on acceptance of *whom*. I discuss more details of the effect of age group in the following section.

2.5.4. Discussion

The high rate of acceptance of *who* in all positions is not surprising, given its frequent use in the spontaneous speech data (Section 2.2). For *whom*, the following pattern emerges: In sentences where *whom* is licensed, according to Lasnik and Sobin's (2000) virus rules, young children accept *whom* at a rate lower than the rate at which they accept *who* in the same context. Acceptance of *whom* increases for middle school and high school students, and then returns to near its kindergarten/elementary school levels for college students. In sentences where *whom* is not licensed by Lasnik and Sobin's virus rules, young children also begin by accepting *whom* at a lower rate than they accept *who*. After elementary school,

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acceptance of *whom* in those sentences then decreases with age/educational level, as illustrated by the decreasing acceptance levels from younger to older subject groups for sentences with *whom* in subject position.[13]

The results of the experiment support the hypothesis tha there is an effect of age group on acceptance of the virus form *whom*. However, the effect is not the one that one might initially expect. One might imagine that before being exposed to intense prescriptive input, young children would accept virus forms at a lower rate than adults, if at all. This is the assumption made by McDaniel, McKee and Bernstein (1998). In fact, young children in this experiment differed from older subjects in that the young children accepted *whom* in a wider range of contexts.

Why do young children frequently accept *whom*, both in contexts where adults accept it and in contexts where adults reject it? I will consider two possibilities. The first possibility is that young children are not able to provide reliable acceptability judgments for this phenomenon. Although Hiramatsu and Lillo-Martin (1998) got children as young as 4;1 to provide acceptability judgments (Hiramatsu and Lillo-Martin 1998), the sentences their children judged had very different types of errors (ex. *What does the coyote don't buy?*). In the case of *who* and *whom*, perhaps children do not notice the distinction, and so they accept *whom* whenever they would accept *who*. Children's behavior on the training casts doubt on this possibility. Recall that for young children, the training began with mispronunciations of words, like *blindergarten* for *kindergarten*.

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[13] Since all subjects in this study continued their schooling through the time of the study, it is impossible to make a clear distinction between effects of age and effects of educational level. It could be revealing, in future work, to compare adults attending or having completed college with those who never attended college.

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Children had to pass this training to participate in the experiment, and children generally picked up on word-level mistakes much more quickly than they picked up on sentence-level mistakes. Children also had to correctly reject at least one sentence with a Case error in the training, showing that they could reject real words in the wrong positions.

The second possible explanation for children's behavior is that young children who accept *whom* base their judgments on a very general *whom* virus, which allows them to accept *whom* in a wider range of contexts than adults do. According to this hypothesis, children get enough input using *whom* to conclude that is a possible form of *who*, but they do not get enough input to narrow down a range of contexts for its use. Following the format for grammatical virus rules used by Lasnik and Sobin (2000), their virus rule for *whom* would look like this:

(79) General "whom" Rule
     If: *who-*   *–m*
               [+ACC]
       1   2
     Then: Check ACC on 2.

As speakers got older and continued hearing input with *whom*, their virus rules would be adjusted so that they applied in a narrower range of contexts.

The proposed narrowing in the contexts for the *whom* rules would require negative evidence. One way this could be available is via indirect negative evidence: After some period of time or number of exposures to *whom*, the language user has heard few or no examples of *whom* in certain positions—for example, in matrix subject position. This absence results in the context of the *whom* rules being narrowed to exclude the possibility of *whom* in such positions.

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Direct negative evidence is also available. It is often argued that direct negative evidence is rarely available to speakers acquiring a first language and that, when it is, speakers are insensitive to it (Braine 1971; Brown and Hanlon 1970). In the case of *whom,* direct negative evidence certainly is available, in the form of prescriptive teaching in school. Furthermore, claims that language learners are insensitive to direct negative evidence are based on studies of young children. By the time individuals receive prescriptive input in middle school or high school, direct negative evidence may have more of an effect on them. It still does not have the effect of causing speakers to conform exactly to the prescribed forms; these forms are modeled on real grammatical rules, and middle school and high school students are past the age of normal language acquisition. But I claim that the direct negative evidence has a more limited effect whereby speakers modify their virus rules to exclude certain forms that they have learned to be incorrect.

2.6. Experiment 2: Nominative pronouns in conjoined NPs in acceptability judgments

2.6.1. Introduction

In this experiment, I gathered acceptability judgment data for nominative pronouns (and their grammatical counterpart, accusative/default pronouns) in conjoined noun phrases. In Section 2.3.3.2, I observed that nominative pronouns in conjoined noun phrases are different from *whom*, in that the former may cause decreased use of their grammatical counterpart, while the latter does not. We will see that nominative pronouns in conjoined noun phrases have some differences

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form *whom* in acceptability judgments as well. In addition, I will test hypothesis analogous to those tested (and supported) in Experiment 1: (i) Acceptance of nominative pronouns will differ for virus and non-virus forms, and (ii) There will be an effect of age group on acceptance of nominative pronouns.

2.6.2. Method

The subjects and procedure were the same as for Experiment 1, as described in Section 2.5.2.

The sentences to be judged included nominative and accusative third person pronouns either preceding or following *and* in subject position, and nominative and accusative first person pronouns either following or preceding *and* as prepositional objects. The test items appear in (80)-(87).

(80) a. Him and Tim were in a play.
   b. Jake will tell his mother that him and Joe want to be superheroes for Halloween.

(81) a. He and Tim ate ice cream.
   b. She and Chris wanted to build a fort.

(82) a. Smurfette said that Sleepy Smurf and her found a big seashell.
   b. Jill and him wandered away from the group.

(83) a. Bert said that Ernie and he could carry the birds.
   b. Lisa said that Bart and she were late.

(84) a. There is a secret between me and Jack.
   b. A little frog hopped up to me and Miss Piggy.

(85) a. That was a good story about I and Big Bird.
   b. The prince gave gold coins to I and Miss Piggy.

(86) a. But then, there was a secret, just between Ernie and me.
   b. The man cried as he walked away from Big Bird and me.

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(87) a. The baby birds were carried by Bert and I.
   b. The frog hopped up to Miss Piggy and I every day.

In (80)-(81), third person pronouns appear as first conjuncts in subject position, while in (82)-(83) they appear as second conjuncts in subject position. Sobin's (1997) *"that she"* Rule will license the nominative pronouns in (81), but not those in (83), since it licenses nominative third person pronouns only following a complementizer. Whether or not this is the correct formulation of the rule, there is independent evidence supporting the claim that *"(s)he and* NP," but not "NP *and (s)he"* is a virus form: Quattlebaum's (1994) subjects were more likely to accept *"(s)he and* NP" (75%) than "NP *and (s)he"* (51%) as a prestige form. As seen below, my subjects made an even stonger distinction between the two forms.

In (84)-(85), first person pronouns appear as first conjuncts of prepositional objects, and in (86)-(87), they are second conjuncts of prepositional objects. According to Sobin's (1997) *"and I"* rule, the nominative pronoun *I* is licensed in (87), but not in (85), since the virus only allows *I* to appear following *and*.

2.6.3. Results

The results of the acceptability judgments of conjoined pronouns appear in Table 15, which gives the percentage of times subjects in each group accepted the test sentences of each type. As before, acceptance of 82% in the kindergarten column indicates acceptance of 23 out of 28 (14 kindergarten subjects * 2 tokens) sentences.

Sentence Type	Kinder.	Elem.	Middle	High	College
Third person as first conjunct of subject; accusative Ex. *Him and Tim were in a play.*	82%	62%	47%	57%	33%
Third person as first conjunct of subject; nominative Ex. He *and Tim ate ice cream.*	89%	88%	90%	90%	83%
Third person as second conjunct of subject; accusative Ex. *Smurfette said that Sleepy Smurf and her found a big sea shell.*	71%	77%	53%	53%	37%
Third person as second conjunct of subject; nominative Ex. *Bert said that Ernie and he could carry the birds.*	64%	65%	30%	33%	43%
First person as first conjunct of prepositional object; accusative Ex. *There is a secret between me and Jack.*	89%	88%	70%	47%	57%
First person as first conjunct of prepositional object; nominative Ex. *That was a good story about I and Big Bird.*	54%	42%	0%	3%	0%
First person as second conjunct of prepositional object; accusative Ex. *But then, there was a secret, just between Ernie and me.*	82%	92%	70%	53%	63%
First person as second conjunct of prepositional object; nominative Ex. *The baby birds were carried by Bert and I.*	68%	77%	73%	83%	77%

Table 15   Percentage of tokens of conjoined pronoun sentences accepted

Subjects in all age groups accepted nominative third person pronouns as first conjuncts of subjects at a fairly high rate (between 83% and 90%). Accusative pronouns in this position were accepted at a lower rate for all subject groups, with kindergarten students showing the smallest difference between nominative and accusative and college students showing the largest difference.

When nominative third person pronouns appeared as second conjuncts of subjects, all subject groups accepted them at a lower rate than when they were

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first conjuncts. However, acceptance of accusative pronouns in this position was not much different than acceptance of accusative pronouns as first conjuncts.

First person pronouns in this experiment appeared as either first or second conjuncts of prepositional objects. Kindergarten and elementary school students accepted the nominative pronoun, *I*, as a first conjunct 54% and 42% of the time, respectively. Older subjects never accepted *I* as a first conjunct, except for a single acceptance by a high school student. All subjects groups accepted *me* as a first conjunct at a higher rate than they accepted *I*, but acceptance of *me* was noticeably lower for the high school and college students than for the other subject groups.

I fared far better as a second conjunct. Subject groups accepted it between 68% and 83% of the time, with the highest acceptance rate coming from the high school students. *Me* as a first conjunct was accepted more than *I* for kindergarten and elementary school students, and less than *I* for older subject groups.

For the purposes of statistical analysis, the test sentences with nominative pronouns were classified as Correct, Viral, or Other as follows:

He and Tim ate ice cream. She and Chris wanted to build a fort.	>	CORRECT
The baby birds were carried by Bert and I. The frog hopped up to Miss Piggy and I every day.	>	VIRAL
That was a good story about I and Big Bird. The prince gave gold coins to I and Miss Piggy.	>	OTHER

Sentences with third person pronouns as second conjuncts fall into a fourth category not included in the statistical analysis: prescriptively correct, but not licensed by a virus.

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Of the sentences included in the statistical analysis, the Correct sentences differ from the Viral and Other sentences in that the former type has third person pronouns and the latter two types have first person pronouns. Ideally for this analysis, all three types would use the same pronouns. Unfortunately, time constraints did not allow for the collection of data on all the possible combinations of pronoun and sentence type. Recall that one prediction to be tested is that acceptance of virus forms will differ from acceptance of non-virus forms; that is, Correct will differ from Other and Viral will differ from Other. Since the Correct sentences differ from the other two types, we may also see a difference between Correct and Viral sentences. In addition, any difference between Correct and Other sentences may be partially attributed to the particular pronouns in the sentences.

A two-way repeated measures ANOVA, with factors Sentence Type (Correct, Viral, Other) and Age Group (Kindergarten, Elementary, Middle, High, College) found a main effect of Sentence type ($F[2, 134] = 114.3$, $p < .001$). It also found a main effect of Age Group ($F[4, 67] = 2.7$, $p = .036$) and an interaction effect between Age Group and Sentence Type ($F[8, 134] = 4.5$, $p < .001$).

Pairwise comparisons were performed by Tukey Test. There were significant differences is acceptance of Correct vs. Other sentences ($p < .001$), Viral vs. Other sentences ($p < .001$) and Correct vs. Viral sentences ($p = .024$). The first two differences support the hypothesis that subjects distinguish between nominative pronouns in virus contexts and those in non-virus contexts. The

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difference between Correct and Viral sentences is not expected based on virus theory alone. However, as discussed above, such a difference could result from the fact that the Correct sentences used third person pronouns and the Viral sentences used first person pronouns. (The person difference may also account for some of the difference between acceptances of Correct and Other sentences.)

The Tukey Test found no significant differences in the pairwise comparisons of Age Groups; however, the pairwise comparisons performs on Sentence Types within Age Groups were revealing. The Correct vs. Other difference was significant for all age groups ($p = .003$ for Kindergarten, $p < .001$ for all others). The Viral vs. Other difference was significant for the Elementary ($p = .006$), Middle ($p < .001$), High ($p < .001$), and College ($p < .001$) groups, but not for the Kindergarten ($p = .389$) group. While the Correct vs. Other distinction may be partially attributed to the difference between first and third person pronouns, both the Viral and Other sentences used first person pronouns. Thus, we can focus on that comparison to see differences in the application of the *"and I"* virus by subjects of different ages. Kindergarten subjects did not distinguish between Viral sentence (virus context) and Other sentences (non-virus context) in their acceptability judgments for sentences with *I*. Older subjects did. This is the same pattern we saw for judgments of *whom*, except that in the case of *whom*, it took until middle school before subjects distinguished between virus and non-virus contexts. The context for the *"and I"* virus appears to be narrowed earlier than the contexts for the *"whom"* viruses.

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2.6.4. Discussion

As was the case for *whom*, young children are more tolerant than adults in the contexts in which they allow nominative pronouns in conjoined noun phrases. This was discussed above for sentences using *I*. It is also true for sentences using *he* or *she*. While middle school, high school, and college students accept *he/she* as a first conjunct far more than they accept it as a second conjunct (88% vs. 35%, across the three groups), the difference is much less pronounced for kindergarten and elementary school students (89% vs. 65%, across the two groups). As discussed in connection with Experiment 1, it would be incorrect to conclude that young children are simply unable to give reliable judgments for this phenomenon; subjects had to pass a training session to participate in the experiment, including rejecting at least one sentence involving a Case error. Rather, I conclude from these results that children rely on more general forms of the grammatical viruses than adults do. For nominative pronouns, this general rule could take one of the forms in (88) or (89).

(88) General Pronoun Rule 1.
    If: [$_{Prn}$ +sg, NOM]
            1
    Then: Check NOM on 1.

(89) General Pronoun Rule 2.
    If: ... *and* [$_{Prn}$ +sg, NOM]...
          1   2
    Or: ... [$_{Prn}$ +sg, NOM] *and* ...
        2   1
    Then: Check NOM on 2.

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(88) allows all singular pronouns to appear in the nominative form. Subjects who accepted the training sentence *My mother made I a chocolate cake* may be using a virus rule of this type.[14] (89) allows nominative pronouns only before or after *and*. Upon further exposure to prestige language input (including negative evidence), speakers employing one of the General Pronoun Rules would, most likely, refine them so that nominative pronouns were allowed in fewer contexts. Since those contexts tend to be different for first and third person pronouns, the General Pronoun Rules would actually evolve into two separate rules.

Recall that in the spontaneous speech data, use of *I* in conjoined noun phrases co-occurred with a decreased use of *me* in conjoined noun phrases. This finding is mirrored in the acceptability judgment data. Acceptance of *me* as a second conjunct was lower for the oldest three age groups than for the youngest two, and the oldest three groups, but not the youngest two, accepted *me* as a second conjunct less than they accepted *I* as a second conjunct. Descriptively, we may label the adult form of the "*and I*" virus an "intrusive virus." Having the virus affects older speakers' use and acceptance of alternative forms where the virus has not applied.[15]

What makes a grammatical virus intrusive? I propose that a grammatical virus is intrusive to the degree that a speaker has conscious thoughts about the usage in question. This entails a separation between the grammatical virus, which is an *ad hoc* rule outside of the grammar, but still subconscious, and speakers'

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[14] To be included in this study, these subjects had to reject another training sentence with an incorrect case form: *I opened mine presents*.

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conscious ideas about language and prescriptive rules. When a speaker has an unintrusive virus, the virus does nothing but license certain forms. When a speaker has an intrusive virus (= grammatical virus + conscious ideas), it licenses virus forms and causes decreased use and acceptance of the grammatical alternative. Future research could test this proposal through an experiment. Adult subjects would be presented with sentences using *who* and sentences using *me* in a conjoined noun phrase in various sentence positions. The subjects would be asked not only to give acceptability judgments but to give explanations for their answers. The prediction made by my proposal is that in addition to being more likely to reject *me* than *who* when each was prescriptively incorrect, subjects would mention the prescriptive rule for *I,* or an approximation of it, in their explanations for the sentences with *me.*

2.7. Summary: Grammatical viruses in acceptability judgments

The acceptability judgment data lead to the following conclusions about grammatical viruses:

- Young children have grammatical viruses in very general forms, and will accept virus forms in a wider range of contexts than do older speakers. The transition to the adult form of the virus may occur at different times for different viruses.

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[15] The results are not as clear for the third person pronouns. The virus rule for nominative third person pronouns seems to fall somewhere between the "whom" rules and the *I* rule in its degree of intrusiveness.

- Speakers with sufficiently narrow contexts in their virus rules distinguish between virus contexts and non-virus contexts in their acceptability judgments of sentences containing virus forms.

- To varying degrees for different viruses, speakers may have conscious thoughts and ideas about the linguistic phenomena relating to a grammatical viruses. I have called this the intrusiveness of the virus.

- For unintrusive viruses, groups of speakers tend to accept the virus form at a lower rate than its grammatical alternative. Intrusive viruses disturb this pattern.

Chapter 3. Properties and Limitations of Grammatical Viruses

3.1. Introduction

The goal of this chapter is to identify how grammatical viruses operate, specifically to state limits on what they can do and what their properties are. The focus of this dissertation is on grammatical viruses that mimic syntactic operations. (Cf. Andersen 1973 on a similar approach to certain effects in phonology.) Thus, we need to find out how grammatical viruses are ordered with respect to syntactic operations. We also need to find out to what extent, if any, grammatical viruses have access to syntactic features and to structural notions such as "subject." For two reasons, it seems that grammatical viruses should be stated with as little reference to such syntactic terms as possible. First, a primary reason for hypothesizing that a grammatical virus causes a certain phenomenon is that the phenomenon acts unlike one governed by syntax. For example, Lasnik and Sobin (2000) argue that *whom* is licensed by a grammatical virus, and not by the normal Case-checking system, because its distribution is so unlike what one would expect of a regular accusative form. The more syntactic notions, such as "feature" and "c-command," a grammatical virus can make use of, the less clear it is why its output looks so decidedly unlike that of syntax. The second reason for trying to exclude such concepts from grammatical virus rules has to do with Fodor's (1983, 1985) claim that the grammar is informationally encapsulated. An

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informationally encapsulated module of the brain exchanges information at only a very shallow level with other modules or with the central processing system. For the grammar to be informationally encapsulated would mean that its objects and relations would not be available to outside systems. By seeing to what extent we can exclude the objects and relations of the grammar from grammatical virus rules, we can put this idea to the test.

Just like each person has his own grammar, producing his own idiolect, grammatical viruses are characteristics of individuals. In fact, we might expect grammatical viruses to have the potential to vary far more between individuals than the actual grammar does. While variation in the grammars of individuals is limited by a system of principles and parameters, these same principles and parameters do not limit variation in grammatical viruses. Thus, I assume that the form a virus rule takes for a person will be much more sensitive to the input that person gets, the importance he or she gives to particular pieces of data, and other individual factors. So far, in this dissertation, I have discussed virus rules as though a single statement of each were sufficient for all speakers. In the remainder of this chapter, as I try to refine various virus rules, I will continue to talk about a single virus rule when possible, for convenience. For example, most speakers I have consulted have identical intuitions concerning the use of "NP *and I*." Since there appears to be very little variation in this virus, I will state a single virus rule that will be sufficient for most speakers (Section 3.3.1). With respect to the use of *whom*, there is a bit more variation, but it is still possible to identify a common pattern of acceptance. This is the pattern that I will attempt to account

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for in Section 3.2. When it comes to the use of "*she/he and* NP," I have found a much greater degree of variation. Therefore, in Section 3.3.2, I focus on the judgments of a single consultant in formulating an associated virus rule. It should be clear that the rule could be modified to account for certain other patterns of judgments.

In Section 3.4, I return to the "signature properties" of grammatical viruses proposed by Sobin (1997). Each one is discussed within the context of the view of grammatical viruses developed in the preceding sections of the chapter.

3.2. Statement of the "whom" viruses

Repeated below are Lasnik and Sobin's (2000) virus rules for *whom*.

(90) The Basic 'whom' Rule
    If: [$_{V/P}$] *who-   -m*
            [ACC]   [ACC]
            1   2   3
    then: check ACC on 3.

(91) The Extended 'whom' Rule
    If: *who -m   ... NP*, where
            [ACC]
            1   2   3
    a) 3 is the nearest subject NP to 2, and
    b) '...' does not contain a V which has 1-2 (a single word *whom*) as its subject
    then: check ACC on 2.

These rules make reference to syntactic notions in three ways: (i) The context for application of the Basic 'whom' Rule requires that *who* have accusative Case. (ii) The action of each virus rule (i.e., the way in which it licenses the appearance of *whom*) is to check an accusative Case feature (which it must first recognize, and then check). (iii) The Extended 'whom' Rule must be able to identify subjects in

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order to check whether or not it should apply. Although Lasnik and Sobin do not

discuss in detail what is meant by "subject," they do suggest that the relevant

notion of "subject" for the Extended 'whom' Rule is a semantic one. As we will

see, using a semantic conception of "subject" in (91) yields incorrect predictions.

For each of these three appearances of syntactic notions in (90)-(91), I will

explore whether the virus rules for *whom* can be stated without it. This means that

I will have to identify the motivation for including the syntactic notions in the

virus rules in the first place, and then provide alternate explanations for these

motivating factors.

Lasnik and Sobin include the requirement that *who* bear accusative Case

in the Basic 'whom' Rule to avoid licensing the catcher (92a). (92b) is another

example that would be incorrectly licensed without this requirement.

(92) a. ! Everyone who was working whom didn't get a raise ought to complain.
                                        (Lasnik and Sobin 2000: 355)
        b. ! I wonder whom left.

Essentially, the issue is that when *whom* follows a verb, yet is the subject of some

other (nearby) verb, it is not licensed.[16] The same point can be made for *whom*

following a preposition, as in (93).

(93) ! The woman I talked to, whom is a genius, gave me a great idea.

The necessity of keeping *whom* away from verbs of which it is subject is also

addressed in the Extended 'whom' Rule, which is used to license *whom* regardless

of Case position. For example, the Extended 'whom' Rule licenses *whom* in (94),

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[16] If *whom* is the subject of a verb that is far enough away (i.e., there is an NP between *whom* and
that verb), it is licensed by the Extended 'whom' Rule.

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where *whom* is associated with a nominative Case position, as subject of *are hungry*.

(94) We feed children whom we think are hungry.

We can adapt the Basic 'whom' Rule so that it operates in a way similar to the Extended 'whom' Rule. This new formulation is stated in (95).

(95) The Basic 'whom' Rule (Version 2)
　　　If: [$_{V/P}$] *who-*　　-*m*　(...V), where
　　　　　　　　　　[ACC]
　　　　　1　　2　　　3　　　4
　　　if 4 is present,
　　　a) 4 is the first V after 3 and
　　　b) 2-3 is not the subject of 4,
　　　then: check ACC on 3.

Two comments are in order concerning (95). First, by removing one of the accusative features from the Basic 'whom' Rule, I have added a reference to the notion "subject." Issues concerning references to subjects in grammatical virus rules are discussed below. Second, this revision makes the Basic 'whom' Rule similar to the Extended 'whom' Rule, in that both want to make sure *whom* is not close to a verb of which is subject. However, the two rules implement this in different ways. Version 2 of the Basic 'whom' Rule looks for the first verb after *whom*, while the Extended 'whom' Rule looks for any verb between *whom* and the next NP. In both cases, *whom* cannot be the subject of any such verb. The only situation in which these types of searches would have different results is one in which there are two verbs between *whom* and the next NP, and *whom* is the subject of the second one. In that case, *whom* would be licensed by Version 2 of the Basic 'whom' Rule ((95)), assuming it followed a verb or a preposition, but not by the Extended 'whom' Rule ((91)). Since I have been unable to come up

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with such a construction, I have opted for what seems to be the simpler statement in (95): one that makes reference only to a verb, instead of to a noun phrase and a verb. It is also possible to revise the Extended 'whom' Rule in this fashion:

(96) The Extended 'whom' Rule (Version 2)
  If: *who* -*m*   (...) V, where
        [ACC]
      1   2   3
  a) 3 is the first V after 2, and
  b) 1-2 is not the subject of 3,
  then: check ACC on 2.

Note that Version 2 of the Extended 'whom' Rule requires a following verb, while in Version 2 of the Basic 'whom' Rule, it is optional. This allows the Basic 'whom' Rule (Version 2) to license *whom* in (97), and prevents the Extended 'whom' Rule (Version 2) from licensing *whom* in (98).

(97) For whom?

(98) Whom for?

I now move on to the issue of the checking of an accusative Case feature by the virus rules. Lasnik and Sobin attach an extra accusative Case feature to the –*m* of *whom*, so that the normal grammatical system must check Case on *who*, and a virus rule must check Case on –*m* (354). One effect of such a system is that the virus rule cannot "rescue" sentences that would have otherwise been ungrammatical due to a lack of Case on *who(m)*. On the other hand, consider a system in which the word *whom* carries only a single accusative Case feature, which can be checked by a grammatical virus. This would incorrectly allow (99), a sentence whose non-virus counterpart, (100), is ungrammatical because *who*

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does not have Case checked. (See Bošković 1991: 15 for a Case-theoretic account of (100).)

(99) * We fed children whom we tried to be healthy.

(100) * We fed children who we tried to be healthy.

With an appropriate model of the relationship between the grammar and virus application, we can rule out (99) without making reference to Case features in the virus rules. Figure 1 gives a first approximation of such a model. According to this model, virus rules operate on the output of the syntax.[17] If a sentence cannot be derived by the syntax, it will never get to the stage of having grammatical viruses applied to it.
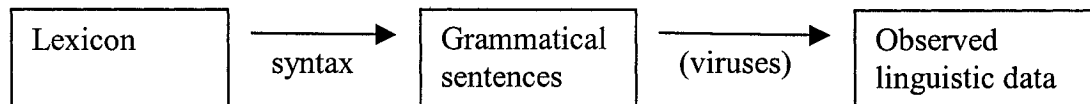

Figure 1   A model of the grammar/virus relationship

This model is simplified. We know, of course, that there are many other factors contributing to the state of observed linguistic data. For example, Section 2.6.4 discussed the possible co-occurrence of certain virus rules with speakers' conscious ideas about the associated prescriptive rules. These ideas have an effect on the observed linguistic data, making Figure 2 a more complete model than Figure 1.

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[17] I do not want to make any claims here about the relationship between other parts of the grammar, such as phonology, and grammatical viruses.

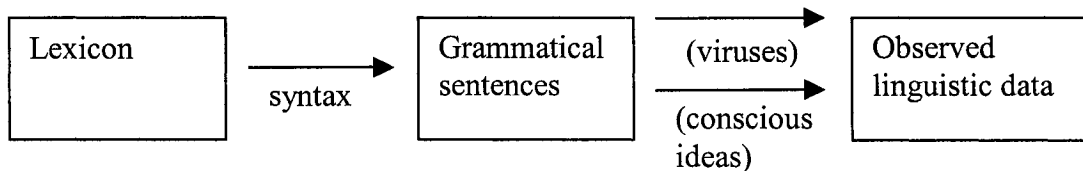| Lexicon | → syntax → | Grammatical sentences | (viruses) → ──────→ (conscious ideas) | Observed linguistic data |

Figure 2   A model including the effect of conscious ideas about language

Now that we have this type of model to ensure that all requirements of the grammar are satisfied, we can change our theory of how grammatical virus rules operate so that they make no reference to Case features (or, for that matter, to any features). In (101)-(102), I restate the "whom" rules without reference to features.[18]

(101) The Basic 'whom' Rule (Version 3)
     If: [$_{V/P}$] *who*   (...V), where
        1   2   3
     if 3 is present,
     a) 3 is the first V after 2 and
     b) 2 is not the subject of 3,
     then: *who* → *whom*

(102) The Extended 'whom' Rule (Version 3)
     If: *who*   (...)   V,   where
       1   2
     a) 2 is the first V after 1, and
     b) 1 is not the subject of 2,
     then: *who* → *whom*

These rules, rather than checking any feature of *whom,* transform *who* into *whom* when it appears in the right context. Contrast this with a system where virus rules check Case features that have not been checked in the syntax. In that type of system, a virus rule turns a sentence that is ungrammatical (because it has an

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[18] I thank Susi Wurmbrand and Jonathan Bobaljik for pointing out some important differences between this way of stating virus rules and another formulation that I had proposed.

unchecked Case feature) into one that is acceptable (by checking the Case feature). In the new system, a virus rule turns an acceptable, grammatical sentence into a slightly different acceptable sentence. (Whether this new sentence is grammatical depends upon one's definition of the term.)

It is possible that the type of lexical transformation occurring in (101) and (102) is the only thing that a grammatical virus can do. If so, then grammatical viruses could not, for example, have any effect on word order.[19] Their effects would often surface in the guise of Case and agreement effects, since these are instantiated on lexical items. In fact, Lasnik and Sobin (2000) notice that "Case and perhaps agreement...[are] the targets of such manipulation by grammatical viruses" [369], and speculate on why this should be, although they come up with a different explanation.[20]

Finally, I must address the reference to "subject" in the rules (101)-(102). Lasnik and Sobin (2000) already had a reference to "subject" in their Extended 'whom' Rule (91). All formulations of the Extended 'whom' Rule allow w*hom* to be an object of a following verb ((103)) or a subject of a verb that is far enough away[21] ((104)), but not a subject of a nearby verb ((105)).

(103) We feed children whom we like.

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[19] Jonathan Bobaljik (p.c.) suggests that there may be a grammatical virus that affects word order by turning *I and Kim* into *Kim and I* or *me and Kim* into *Kim and me*. Further investigation is required to determine the merits of such a proposal.

[20] Their suggestion is that grammatical viruses affect Case and agreement features because these features are at the core of the computational system for human language. Grammatical viruses arise from prestige language, which attempts to alter what is seen as "degenerate" language. So, Lasnik and Sobin ask, "Given a belief in the linguistic superiority of the prestige variety, what better way to attempt to manifest this claimed superiority than by appearing to manipulate not just arbitrarily selected features but features central to the operation of the core computational system?" [369].

(104) We feed children whom we think are hungry.
(105) ! We feed children whom are hungry.

Lasnik and Sobin claim that it is a semantic notion of "subject" that is relevant for the Extended 'whom' Rule. Subject status is determined by considering theta roles, which, they point out, "a speaker must be cognizant of to understand the sentence" [359]. This is how they prevent *whom* from being licensed in (106); although (106) could be derived from *It is whom*, where *whom* is a syntactic object, *whom*'s theta role qualifies it as a semantic subject in this copular construction.

(106) ! Whom is it?

Lasnik and Sobin do not spell out which theta roles qualify *whom* as a subject. Let us try to avoid this issue by assuming that an NP's semantic subjecthood depends on the position in which the NP was merged into the structure; in (107), *whom* is a semantic subject, and in (108), in which passive raising has taken place, *whom* is not a semantic subject.

(107) ! Whom won the election?
(108) ! Whom was elected by the people?

Then, any version of the Extended 'whom' Rule we have seen so far predicts that *whom* should be licensed in (108), but not in (107). In fact, according to my consultants, both sentences are equally unacceptable. Thus, it appears that the notion of "subject" under consideration is not the correct one.

I would like to propose, instead, a way of stating the *whom* virus rules that do not refer at all to the notion of subject.

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[21] According to the original Extended 'whom' Rule (91), the verb *are* is far enough away from *whom* in (104) because the NP *we* intervenes. According to Versions 2 and 3 of the Extended

(109) The Basic 'whom' Rule (Version 4)
  If: [$_{V/P}$] *who*   (...V), where
       1   2   3 4
  if 4 is present,
  a) 4 is the first main verb after 2 and
  b) 3 contains a noun,
  then: *who* → *whom*

(110) The Extended 'whom' Rule (Version 4)
  If: *who*   ...   V, where
       1   2   3
  a) 3 is the first main verb after 1, and
  b) 2 contains a noun,
  then: *who* → *whom*

These rules appeal to an intuitive notion of "subject": A subject is a noun (or a noun phrase) that precedes a verb. They prevent *whom* from being a subject by requiring that some other noun intervene between *whom* and the following main verb. *Whom* will not be licensed in either (107) or (108) by either rule because in both sentences, *whom* is followed by a main verb (*won*, *elected*) without the presence of an intervening noun phrase. In the same way, we prevent the licensing of *whom* in (106). Let us assume that this sentence is derived from *It is whom*. Since main verb *be* raises in English questions, the subject *it* does not intervene between *whom* and *is* in (106), and *whom* is not licensed. On the other hand, in (111), which is a slipper, the auxiliary verb *will* raises. *Be* remains *in situ*, so that *it* intervenes between *whom* and *be*, and *whom* is licensed by the Extended 'whom' Rule (Version 4).

(111) Whom will it be?[22]

'whom' Rule ((96) and (102)), it is the verb *think* that intervenes.

[22] Lasnik and Sobin (2000) also discussed the contrast between (106) and (111). Their Extended 'whom' Rule only searches up to the first noun phrase following *whom*. In (106), it finds *is*, of which *whom* is semantic subject, before the first noun phrase, so *whom* is not licensed. In (111), it finds *it* before getting to a theta-role assigning verb, so *whom* is licensed.

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I will leave it to the reader to confirm that rules (109) and (110) give the correct result in all other sentences that have been considered.

There is one type of sentence for which (109) and (110) make incorrect predictions. In American English, main verb *have* is generally not a raising verb, but it can raise in a limited number of cases, in sentences such as (112) and (113).

(112) Whom have we here?

(113) Whom have we to thank for this?[23]

The latest versions of the *whom* rules incorrectly fail to license *whom* in these sentences: the Basic 'whom' Rule, because *whom* does not follow a verb or a preposition, and the Extended 'whom' rule, because there is no noun intervening between *whom* and the main verb *have*. Rather than reject rules (109) and (110) on the basis of (112) and (113), I will conclude that *whom* is allowed in these sentences by another mechanism. After all, this type of sentence is already exceptional in American English because of the raising of *have*. It may be that raising of main verb *have* is only possible in certain formulaic utterances, which also include *whom*. Another possibility is that raised *have* satisfies the context for a separate *whom* virus rule, as in (114).

My rules (109) and (110) are very similar in spirit to Lasnik and Sobin's *whom* rules. Some primary differences are motivated by the unacceptability of (i).
(i) ! I wonder whom left.
This sentence forces me to add an extra restriction to the context of application for the Basic 'whom' Rule. I have done this by having the rule search for a verb after *whom* and require a noun between *whom* and that verb. This contrasts with Lasnik and Sobin's approach, in their Extended 'whom' Rule, of searching for an NP and forbidding a verb from appearing between *whom* and that NP. While using that restriction in my Basic 'whom' Rule would correctly rule out (i), since no NP is found, it would incorrectly rule out simple cases like (ii), in which no NP appears, but *whom* is still licensed.
(ii) For whom?

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(114) If: *whom*   *have*   *NP*
         1   2   3
     then: *who → whom*

Inclusion of 'NP' in the context of rule (114) ensures that the virus rule will not apply to (115), which, to my ear, is a catcher.

(115) ! We will meet athletes whom have run a marathon.

I will retain (109) and (110) as my final versions of the *whom* rules. Of the various versions of the rules I have tried, they account for the most data. Furthermore, the only references to grammatical notions that remain in these rules are the terms "noun," "preposition," and "(main) verb." I see no way to formulate the rules governing the distribution of *whom* without these terms. It must be concluded that the parts of speech are, to some degree, accessible to speakers outside of the syntactic system. This does not exclude the possibility that a speaker will incorrectly identify the part of speech of a particular word, affecting his application of virus rules.

3.3. Statement of the nominative pronoun viruses

Spontaneous speech data and acceptability judgment data have confirmed that separate virus rules govern the distribution of first and third person singular nominative pronouns in conjoined noun phrases. One difference between them, for example, is that speakers prefer that the first person nominative pronoun follow *and*, and they prefer that the third person nominative pronouns precede *and*. In this section, I will consider the best way to state the viruses governing the

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[23] Thanks to Diane Lillo-Martin for pointing out this example.

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use of the pronouns. I will attempt to achieve the same reduction in references to the grammar that I did for the *whom* rules in Section 3.2.

3.3.1. First person nominative pronouns

Below is the virus rule for *I* in conjoined noun phrases, as stated by Sobin (1997).

(116) The "...*and I*..." Rule
    If: ...and [$_{Pm}$ +1, +sg, NOM]...
                1   2
    Then: check NOM on 2.

This rule licenses *I* as a second conjunct (whether or not it is part of a subject), but not as a first conjunct ((117)-(118)).

(117) a. Julie and I talked.
      b. ! I and Julie talked.

(118) a. Rebecca met Deborah and I.
      b. ! Rebecca met I and Deborah.

Immediately, one notices that rule (116) checks a Case feature, just like Lasnik and Sobin's (2000) rules for *whom*. As I did for those rules, I would like to remove references to grammatical objects and operations, to whatever extent is possible. The revised rule below simply changes *I* to *me* when it follows *and*. Note that the context has been changed to look for the particular word *me*, rather than requiring the virus rule to identify its pronoun status, person, and number.

(119) The "...*and I*..." Rule (Version 2)
    If: ...and   me...
            1   2
    then: *me* → *I*

With the addition of these minor notational changes, the "*and I*" Rule is already devoid of reference to the grammar. The only further change that must be made to this rule is one requiring *I* to actually be part of a conjunction of noun phrases. This is necessary to avoid licensing the catchers in (120), in which *I* follows *and* but is not conjoined with another noun phrase.[24]

(120) a. ! Brian wants Larissa to win and I to lose.
     b. ! Tim partnered Laura with Adam and I with Ryan.

One way to do this would be to require an intonational phrase corresponding to the conjunction of noun phrases.

(121) The "*...and I...*" Rule (Version 3)
    If: NP...and   me...,   where
       1   2   3
    1-2-3 forms an intonational phrase,
    then: *me → I*

3.3.2. Third person nominative pronouns

The situation with third person pronouns is more complicated than that with first person pronouns because the contexts in which they are licensed are more restricted. While "NP *and I*" can appear as a subject or an object, "*she/he and* NP" has been shown to be more acceptable in subject position than in object position. Sobin (1997) tried to capture this with the following virus rule (which I have renamed, in anticipation of revisions to it).

(122) The "*she and...*" Rule
    If: ...that [$_{Prn}$ +3, +sg, NOM]...
            1   2
    Then: check NOM on 2.

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[24] If the examples in (120) are slippers for some speakers, all we need to say is that those speakers have the virus rule in (119), and not the one to be introduced in (121).

As stated, the rule applies in sentences where *she* follows the complementizer *that*, but in order to account for the acceptability of (123), it must be assumed that this sentence contains an unpronounced complementizer which also triggers application of rule (122).

(123) She and Jacob sang.

This is undesirable, given that I have been trying to formulate virus rules that apply to surface strings, without reference to the grammar.

There are also empirical problems with a virus rule that licenses *she* after a complementizer. Consider (124)-(127). (124) shows that a regular accusative object can be topicalized in English. (125) shows that an object consisting of an accusative pronoun conjoined with another noun phrase can also be topicalized. As expected, *she* cannot appear as an object *in situ* in (126a). However, assuming that topicalization is to a position following the complementizer,[25] Sobin's rule (122) incorrectly predicts that topicalizing *she*, as in (126b) should improve its acceptability. However, it is only if *she* is a first conjunct that topicalizing it improves its acceptability ((127)).

(124) a. I like her.
    b. Her, I like.

(125) a. I like her and Karin.
    b. Her and Karin, I like.

(126) a. ! I like she.
    b. ! She, I like.

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[25] For those who allow embedded topicalization, it is, in fact, to a position following an overt complementizer:
(i) Eric thinks that her, I like.
(ii) Eric thinks that her and Karin, I like.
(iii) ! Eric thinks that she, I like.

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(127) a. ! I like she and Karin.
      b. She and Karin, I like.

It appears that the rule licensing *she* in conjoined noun phrases is actually sensitive to the presence of the conjunction, as well as to the position of the conjunction within the sentence.

Let us explore further in what positions "*she/he and* NP" can appear. Since judgments are not always clear for these sentences and there seems to be a lot of variation, I report below the judgments of one consultant, and try to formulate a virus rule that is consistent with them.

(128) a. Him and Christi were here five minutes ago.
      b. He and Christi were here five minutes ago.

(129) a. Him and Christi, I like.
      b. He and Christi, I like.

(130) a. Geoff made him and Christi out to be fools.
      b. Geoff made he and Christi out to be fools.

(131) a. I believe him and Christi to be fools.
      b. I believe he and Christi to be fools.

(132) a. I saw him and Christi.
      b. ! I saw he and Christi.

(133) a. I gave Geoff him and Christi.[26]
      b. ! I gave Geoff he and Christi.

(134) a. I gave the book to him and Christi.
      b. ! I gave the book to he and Christi.

(135) a. I gave him and Christi the book.
      b. ! I gave he and Christi the book.

My consultant accepts "*he and* NP" in (128)-(131). These include the positions of subject and topicalized object, which have already been discussed, and include

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(iv) Eric thinks that she and Karin, I like.

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ECM subjects. The consultant does not accept "*he and* NP" as direct object (whether or not it immediately follows the verb) or indirect object (with or without preposition).

I propose the following rule for this consultant and other speakers who share his judgments:

(136) The "*she and...*" Rule (Version 2)
    If: ...*her/him*   *and* ... NP   V,   where
         1   2   3   4
    4 assigns a theta-role to 1-2-3,
    Then: *her/him* → *she/he*

The requirement in (136) that the verb assign a theta-role to the nominative pronoun anticipates that adding some other verb to a sentence like (135b), as in (137) (i.e., the addition of *bought*, not thematically related to *he and Christi*), will not improve acceptability.

(137) ! I gave he and Christi the book that I bought.

I assume a speaker can identify when the pronoun under consideration has the right kind of meaning relationship to a following verb for the virus rule to apply.

3.4. The signature properties revisited

In Section 1.3.3, I discussed Sobin's (1997) "signature properties" for grammatical viruses. These were characteristics that set grammatical viruses apart from normal grammatical processes. Sobin did not require all viruses to display all of the properties, but when a phenomenon displayed many of the properties, he took that to be an indication that a grammatical virus was involved.

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[26] A context for this sentence could involve assigning members of a team to a team captain.

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In this section, I will revisit each of the proposed signature properties to see which, if any, should be retained as tools for identifying grammatical viruses.

3.4.1. Lexical specificity

This property of grammatical viruses manifests itself in more than one way. First, I have proposed that the function of a grammatical virus is to change the form of a lexical item. Thus, grammatical viruses allow certain lexical items to appear in certain contexts. Unlike in the grammar, according to which a lexical item's distribution is determined is connected to its membership in a particular category category (noun, verb, etc.), it is an idiosyncratic property of a lexical item to be affected by a grammatical virus. Second, contexts for application of grammatical viruses may include specific lexical items, as in the rules for nominative pronouns in conjoined noun phrases, which have the lexical item *and* in their contexts. The contexts may also include categories of lexical items, such as noun and verb, but this does not set grammatical viruses apart from grammatical processes.

3.4.2. Directionality

All of the grammatical viruses I have discussed in this chapter display the property of directionality. *Whom* is sensitive to verbs and prepositions before it and to verbs and noun phrases after it. *I* is sensitive to *and* before it, while *he* and *she* are sensitive to *and*, as well as verbs, after them. It is virtually assured that all

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grammatical virus rules will show directionality effects of this kind since they operate on surface strings, linear arrangements of words.

3.4.3. Adjacency

The fact that grammatical viruses look at surface strings for their contexts allows for certain adjacency effects that are not typical of grammatical processes. For example, the "*and I*" virus operates when *and* is adjacent to *I*. *I* is not licensed in sentences with intervening modifiers, such as

(138) ! John will help you and, hopefully, I.

But similar to Lasnik and Sobin's (2000) virus rules for *whom*, the virus rules that I have settled upon in this chapter can affect a particular word based on a context including words that are not adjacent to it. So virus rules may or may not show effects of adjacency. Notice, though, that locality in a grammatical virus rule will always make reference to the linear order of words in a string, never to structure. Sobin (1999) actually suggested that adjacency should be understood in this way in his discussion of a proposed grammatical virus for expletive constructions[27], when he said that grammatical viruses look for "the 'nearest' items of the appropriate type" (332).

3.4.4. Nonlocality

The property of nonlocality, as defined by Sobin (1997), means that virus rules should be insensitive to non-lexically headed phrases. Sobin gives two examples showing the effects of nonlocality. The first has to do with application

of his *"that she"* rule. Sobin assumes the structure in (139a) for a phrase like (139b). In his virus rule, it is the sequence "complementizer 3-sg-pronoun" that is necessary for the licensing of *she/he*. In (139b), *she* is licensed although there is material intervening between the complementizer and the pronoun in the representation (139a). Sobin's explanation is that the phrases Agr$_s$P and NP$_1$ do not have lexical items as heads, and so they are ignored by grammatical viruses.

(139) a. ...[$_C$ Ø/that] [$_{Agr-sP}$[$_{NP-1}$ NP$_2$ and NP$_3$]...
        b. ....that she and Bill...

The second example of nonlocality involves the *"and I"* virus. For Sobin (1997), this virus licenses *I* whenever it immediately follows *and*. If we consider lexical items only, this is the case in both examples in (140), yet Sobin reports that *I* is more acceptable in (140a) than in (140b), an intuition that I share.

(140) a. For Mary to be the winner and [$_{SC}$ I the loser] is unfair.
        b. For Mary to be the winner and [$_{IP}$ me/??I to be the loser] is unfair.

<div align="right">(Sobin 1997: 331)</div>

The explanation in terms of nonlocality is as follows: The small clause in (140a) does not have a lexical head, and it can be ignored. On the other hand, the IP in (140b) is headed by *to*, so the presence of the IP destroys the adjacency between *and* and *I*, preventing application of the virus.

Given the view of viruses that has been presented in this chapter, grammatical viruses should not be sensitive to any phrase boundaries or nodes of syntax that do not correspond to pronounced words in the linear string output of the grammar. Thus, the question of whether a phrase is lexically headed is irrelevant. So, even if we ignore the developments in Section 3.3.2 and use

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[27] See Section 4.1.

Sobin's *"that she"* Rule," Agr_sP and NP_1 in (139) are ignored by the virus rule, not because they are not lexically headed, but because they are not present in the overt linear string that is accessible to grammatical virus rules. Similarly, virus rules do not have access to either the SC boundary in (140a) or the IP boundary in (140b). The difference between them will have to be explained by other means. I have proposed that the *"and I"* virus only applies to an "NP *and I*" phrase, which is identified by intonation. Since neither (140a) nor (140b) contains such a phrase, my version of the *"and I"* virus applies to neither one. Perhaps some other virus rule licenses *I* in (140a), but not in (140b); I will leave this to future research.

Grammatical viruses, then, are not sensitive to the boundaries of phrases that are not projected from lexical heads, but they are not sensitive to other phrase boundaries either. Instead of "nonlocality," we could call this property "structure insensitivity."

3.4.5. Overextension and underextension

Prestige language often attempts to mimic characteristics of other languages, such as Latin. The characteristics being mimicked are produced by the grammars of those languages. For example, Case in Latin is produced by its grammar. When grammatical viruses try to produce the same effects, without access to the grammar, it is not surprising that the results do not mirror what one would expect in the "model" language. This is overextension and underextension.

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3.5. Why are viruses viruses?

One might wonder, since I have claimed that young children are exposed to and sensitive to prestige input, why they do not acquire, for example, *whom* as part of their grammars. The answer to this question is that complete virus paradigms are unlearnable by the language acquisition device (LAD). The fact that speakers do not acquire a form *whom* within the grammar underscores the point that the LAD is a system that is limited in the language systems it can acquire. A complete paradigm for adults' intuitions concerning the use of *whom* demonstrates that the relevant rule is lexically specific, sensitive to linear order, insensitive to hierarchical structure, etc. This is not the type of rule that the LAD is able to acquire.

3.6. Conclusion

In this chapter, I have formulated virus rules to account for the distribution of *whom* and of nominative pronouns in conjoined noun phrases. These rules make no reference to the grammar itself, operating only on surface strings. They do require speakers to put lexical items into categories like noun, verb, and preposition. However, as stated above, the divisions that speakers make between these categories for the purpose of grammatical viruses may not be identical to the way these categories are divided in the grammar.

It has been possible to state virus rules without reference to the grammar, attaining a higher level of empirical coverage than previous statements of virus rules that did make reference to the grammar. Therefore, I conclude that all virus

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rules are stated without reference to the grammar and that grammatical viruses do not perform syntactic operations. In addition, I will maintain a model in which all syntactic operations must apply and syntactic requirements be satisfied before application of grammatical virus rules. This means that grammatical viruses are limited to changing the forms of words within grammatical sentences; they cannot produce acceptable output from ungrammatical sentences.[28]

Because a grammatical virus operates on surface strings, it has certain properties that distinguish it from grammatical processes. These are:

- Structure insensitivity

- Directionality

- Possible lexically specificity

- Possible dependence on adjacency (although some non-viral processes like affix-hopping can also depend on adjacency)

In addition, we expect grammatical viruses to overextend and/or underextend with respect to the processes that they mimic.

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[28] Cf. Sobin (1994), "An Acceptable Ungrammatical Construction." Sobin defines an ungrammatical sentence as one that cannot be produced by the grammar. In my view, although a sentence that has been affected by a grammatical virus is not wholly produced by the grammar, it is derived from a sentence that has been produced by the grammar.

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Chapter 4. Other phenomena as potential grammatical viruses

In Chapter 2, I discussed how speakers use grammatical viruses in spontaneous speech and in acceptability judgment tasks. In Chapter 3, I proposed that grammatical viruses are rules applying to surface strings, and that this results in certain properties not seen in grammar-produced phenomena. The results in these chapters were based on analyses of *whom* and nominative pronouns in conjoined noun phrases in English. I consider these to be paradigm cases of grammatical viruses because they are both cases in which it is clear that many English speakers have intuitions based on rules that are sensitive to linear order and not to hierarchical structure. In this chapter, I will examine three additional phenomena in English for which one might consider a virus analysis. The three phenomena are plural agreement in expletive constructions ((141)), preposition pied piping and a variation on preposition pied-piping ((142)), and *"if...were"* constructions (143):

(141) There are three men in the room.

(142) a. That is the pen with which I wrote.
      b. That is the pen with which I wrote with.

(143) Gil wondered if Aaron were busy.

For each of these phenomena, I will consider how it is used in spontaneous speech and/or acceptability judgments, comparing with the results from Chapter 2. I will

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also consider whether it is possible to state an appropriate virus rule, comparing with the results of Chapter 3. Specifically, the plausibility of a virus analysis will be supported if it is found that a virus rule insensitive to hierarchical structure can be stated; young children accept the form in question in virus and non-virus contexts; older subjects accept the form only in virus contexts; and subjects of all ages produce the form rarely, if at all, in casual spontaneous speech.

4.1. Agreement in expletive constructions

In addition to the nominative-checking viruses discussed in Section 1.3.3, Sobin (1997) argues that a grammatical virus is responsible for allowing plural agreement in expletive constructions (ECs), as in (144).

(144) There are three men in the room.

While many analyses assume that the grammar causes the verb in an EC to agree with its associate either directly or indirectly (eg. Chomsky 1986, 1993, 2000; Lasnik 1995; cf. Bošković 1997, who also discusses first conjunct agreement), Sobin uses evidence from first conjunct agreement to argue that this is not the case. Sobin's relevant data appear below. (145) and (146) show the average ratings assigned to various sentence types by Sobin's informants. Informants were asked to rate the sentences on naturalness, on a scale from 0 (completely unnatural) to 5 (completely natural). Following each rating is a sample test item of the corresponding type.

(145) a. there is np...   (4.03)   There is a pen on the table.
      b. there are np...   (0.11)   There are a pen on the desk.
      c. there is nps...   (1.39)   There is four keys on the desk.
      d. there are nps...   (4.31)   There are some cups on the table.
      e. there is np and np...   (3.58)   There is a pen and a stamp on the desk.
      f. there are np and np...   (0.81)   There are a pen and a book on the desk.
      g. there is np and nps...   (2.86)   There is a key and some pencils on the table.
      h. there are np and nps...   (0.61)   There are a cup and some plates on the table.
      i. there is nps and np...   (1.69)   There is some cups and a spoon on the table.
      j. there are nps and np...   (4.00)   There are some books and a pencil on the table.
      k. there is nps and nps...   (1.67)   There is six bowls and some cups on the table.
      l. there are nps and nps...   (3.81)   There are two cups and some plates on the table.

(146) a. np is...   (4.72)   A pen is on the table.
      b. np are...   (0.00)   A book are on the table.
      c. nps is...   (0.19)   Two keys is on the desk.
      d. nps are...   (4.78)   Three cups are on the table.
      e. np and np is...   (2.22)   A cup and a napkin is on the table.
      f. np and np are...   (3.31)   A book and a pen are on the desk.
      g. np and nps is...   (0.81)   A key and six coins is on the desk.
      h. np and nps are...   (3.83)   A spoon and some cups are on the table.
      i. nps and np is...   (1.78)   Some plates and a bowl is on the table.
      j. nps and np are...   (3.56)   Some books and a letter are on the desk.
      k. nps and nps is...   (0.69)   Some plates and some bowls is on the table.
      l. nps and nps are...   (4.31)   Some bowls and two plates are on the table.

As the ratings of ECs in (145) show, the informants, on average, strongly preferred agreement with the first conjunct in a coordinated associate. For example, sentences like *There is a pen and a stamp on the desk* got an average rating of 3.58, while sentences like *There are a pen and a book on the desk* got an average rating of only 0.81. This is despite the fact that when a coordinated

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associate appears in subject position, plural agreement is always preferred, as shown by the ratings in (146e-l).

Since the agreement facts for the ECs diverge from those for sentences with lexical subjects, Sobin concludes that an analysis of ECs that has the associate agree as if it were a lexical subject cannot be correct. Instead, he proposes that in ECs, the agreement features of the verb are checked via normal spec-head agreement with its subject, *there*, which always has singular agreement features. Thus, singular agreement is the only grammatical option in ECs. Plural agreement, he claims, is caused by a grammatical virus that allows the plural form of *be* when followed by a plural NP. The virus rule, as stated by Sobin, is given in (147).

(147) The *"there are..."* Rule
      If: there   [$_{Agr-s}$ +pl] ... be [$_{NP}$ +pl] ...
             1   2   3   4
      then: check the plural feature on 2.   (Sobin 1999: 335)

This rule allows a plural verb after *there* if that verb is followed by (or, as Sobin explains, coincides with) a form of the verb *be* that is immediately followed by a plural NP. Crucially, the virus is insensitive to hierarchical structure; a coordinated associate where the first conjunct is singular does not activate the virus, but a coordinated associate where the first conjunct is plural does.

Sobin supports his view by claiming that plural agreement in ECs displays many of the signature properties of a virus. However, Schütze (1999) argues that "English expletive constructions are not infected" by claiming precisely the opposite: that plural agreement in ECs fails to display the signature properties of a virus. In Section 4.1.1, I will discuss the arguments made by both Sobin and

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Schütze, also taking into account the conclusions about the signature properties of viruses that I reached in Section 3.4.

4.1.1. Plural Agreement in ECs and the signature properties of viruses

4.1.1.1. Lexical specificity

Sobin suggests that the rule producing plural agreement in ECs is specific to the word *there*, since it does not apply in sentences with the expletive *it* or with other copular constructions.

(148) It is/*are your friends at the door.

(149) The problem is/*are those loose wires.   (Sobin 1997: 333)

He also mentions that although plural agreement can occur in ECs with verbs other than *be*, as in (150), the virus is limited to applying to certain verb forms.

(150) There *have* always been *cookies* and milk on the table.

Specifically, he claims that the virus checks only plural features, since singular agreement can be checked through normal syntactic agreement with *there*.

In Sobin's formulation of the virus rule in (147), it is not necessary that *be* bear plural agreement features. Rather, *be* must be present in the sentence. Sobin notes that elements 2 and 3 (the affected verb and *be*) may or may not coincide.

Schütze disputes both of Sobin's claims of lexical specificity. First, he cites (151) to show that there are sentences without *there* in which plural agreement occurs with an NP not overtly in subject position.

(151) On the table are many cookies.

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As for verbs, Schütze points out that, besides the examples given by Sobin, plural agreement in ECs can also occur with other verbs such as those in (152).[29]

(152) a. There appear/?appears to be cookies on the table.
       b. There tend/?tends to be cookies on the table when Johnnie comes home.

To these, we can add sentences that do not contain *be* at all:

(153) Each evening, there arrive/*arrives five knights.

What should we conclude from these examples? The acceptability of (151) does not rule out the possibility that there is a grammatical virus rule allowing plural agreement after *there* and before a plural NP. Even if the grammar required singular agreement with *there* in ECs, it could still be the case that (151) is ruled in by the grammar, the verb agreeing with *many cookies,* which is the only NP available for agreement. More problematic are the examples in (152)-(153). While Sobin's rule (147) could easily be modified so that it is not sensitive to the presence of any particular verb, this rule, like (147), would make reference to the plural agreement feature of the verb. I have argued that grammatical virus rules do not have access to syntactic features. Instead, they can only modify forms of specified lexical items. For example, the *"and I"* changes *me* to *I* in certain contexts. It does not affect all nouns, or even all pronouns. So, for example, the nominative pronoun *us* is not affected by the rule: the virus rule does not license *we* in (154).

(154) * Give the book to Joan and we.

Compare this to the situation with plural agreement in ECs. If there is a virus producing plural agreement in that case, we expect the phenomenon to be limited

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[29] Schütze does not specify the source of these data. Presumably, they come from introspection.

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to a particular lexical item[30]: the plural form of a particular verb. The possibility of plural agreement on any verb in an EC contrasts with grammatical viruses that affect the form of a particular lexical item.

4.1.1.2. Adjacency

Sobin's claim of adjacency for his proposed virus is that "the two constituents involved (the finite verb and an NP) are the 'nearest' items of the appropriate type" (332). This means that for plural agreement to be checked, the linearly nearest NP to the right of the verb must be plural (see Section 4.1.1.3: Directionality). In (155), the verb and the NP are strictly string adjacent; however, Sobin cannot require strict adjacency because of the acceptability of (156) and (157).

(155) There are cookies and milk on the table.

(156) There have always been cookies and milk on the table.

(157) There are supposedly cookies and milk on the table.

Schütze objects to the "nearest item of the appropriate type" view of adjacency, since it is not consistent with what is found in Sobin's (1999) nominative viruses, the only other examples of grammatical viruses available in the literature at that time. In those viruses, a strict notion of linear adjacency appears to be relevant, as seen in (158).

(158) a. John will help you and I.
      b. ! John will help you and even I.

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[30] Or a very limited set of lexical items, as in the rule licensing *she* or *he* before *and*.

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As discussed in Section 3.4.3, the virus rules for *whom* show us that strict linear adjacency is not always relevant to virus rules. What is important is that any locality requirements be stated in terms of linear order in a string, and without reference to structure. This is consistent with Sobin's suggestion for the formulation of the *"there are…"* virus.

4.1.1.3. Directionality

Recall that in the data collected by Sobin, subjects preferred agreement with the first NP to the right of the verb in ECs, but in the sentences with regular lexical subjects, the preference for agreement with the nearest NP to the left of the verb was much weaker. Sobin refers to this fact in discussing directionality as a property of plural agreement in ECs.

Schütze objects, however, that plural agreement is strongly preferred in examples like (159), in which the plural NP *how many cookies* appears to the left of the verb.[31] He also points out that plural agreement is more strongly preferred in (159) than in (160). This is especially problematic for Sobin's theory that singular agreement is the only grammatical option in ECs.

(159) How many cookies are/*?is there on the table?

(160) There is/'s/are lots of cookies on the table.   (Schütze 1999: 468-169)

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[31] Again, Schütze's claim does not appear to be based on formal data collection.

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4.1.1.4. Overextension and underextension

Sobin gives what appears to be a straightforward example of the underextension of plural agreement in ECs. He notes that if the grammar produced plural agreement in ECs, we would expect to see a plural verb in (161).

(161) There are a pencil and some stamps on the desk.

Yet sentences of that type received an average rating of only .61/5 in Sobin's judgment test, compared to a rating of 2.86 when the verb was singular. Despite these facts, I will provide evidence in Section 4.1.3 that plural agreement in (161) is actually grammatical, comparing it to another type of EC in which plural agreement is impossible.

Sobin does not commit to any cases of overextension of plural agreement in ECs, but he does say that "preliminary evidence of overextension into interrogatives with *where* has been reported (Lisenby 1995)" (333). Here, he refers to the finding that first conjunct agreement occurs in sentences like (162)-(163).

(162) Where's/is a pencil and some stamps?

(163) Where are some stamps and a pencil?

By suggesting that the possibility of first conjunct agreement in sentences with *where* indicates the overextension of a *"there are..."* virus rule, Sobin uses the term *overextension* in a different sense than we have seen before. As discussed in Sections 1.3.3.5 and 3.4.5, overextension occurs when a virus rule licenses some form in a context where we would not expect the grammar to do so in any

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language. For example, the *"and I…"* Rule overextends when it allows *I* to appear in (164), since a language whose grammar checked nominative Case in conjoined noun phrases would not check it there, where *Ellen and I* appears in object position.

(164) Justin called Ellen and I.

The fact that a virus rule applies in a wider range of contexts than previously thought, or applies although its context is not satisfied, as would be required for the *"there are…"* Rule to license plural agreement in (163), is quite different from overextension in the sense discussed above.

Schütze actually takes the fact that first conjunct agreement in seen in (162)-(163) as an argument against a virus analysis of plural agreement in ECs, since it shows that first conjunct agreement occurs more generally than in sentences with an expletive subject. (Recall that Sobin's analysis relied upon the verb agreeing with singular *there* in the grammar.)

Of the virus properties then, the ones that actually seem to hold for plural agreement in ECs are sensitivity to linear order and underextension. The former is illustrated by the low rating Sobin's subjects gave to sentences like (165), where a plural NP is the second conjunct in the associate, compared to the higher rating of (166), where a plural NP is the first conjunct in the associate. The low rating of (165) also illustrates underextension, under the assumption that grammatical agreement will always take place with an entire coordinated NP, and not with one of its conjuncts.

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(165) There are a pencil and some stamps on the desk. (Rating: .61/5)

(166) There are some books and a pencil on the table. (Rating: 4.00/5)

In the following sections, I will argue that it is incorrect to attribute plural agreement in ECs to a grammatical virus, and that the unusual properties observed should be accounted for in another way. These arguments will come from a spontaneous speech study (Section 4.1.2) and a theoretical analysis (Section 4.1.3).

4.1.2. Spontaneous Speech Study 3: Agreement in ECs in child and adult speech

4.1.2.1. Goal

The purpose of this study was to see what type of agreement adults and children use in spontaneous speech in sentences that have expletive subjects and plural associates. The hypothesis to be tested is one that follows from Sobin's proposed virus rule: Plural agreement will be used in ECs only when the first NP following the verb is plural. I will also be testing to see whether it is the case that children use plural agreement in ECs at a much lower rate than adults do, as was the case with *whom*, and nominative pronouns in conjoined noun phrases.

4.1.2.2. Method

The same ten CHILDES corpora used in Spontaneous Speech Studies 1 and 2 were searched using the Clan program *combo*. The program was used to extract from the corpora all utterances containing the word *there* and one of the following: *is, are, was, were, isn't, aren't, wasn't, weren't*. Also extracted were

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any utterances containing *there's* or *there're*. These utterances were then hand searched to find those that were clearly expletive constructions with plural associates. The resultant utterances were hand coded as either "virus context" or "non-virus context." An utterance was classified as "virus context" if the first NP following the verb was plural. Utterances were also coded as either adult or child utterances and as having either singular or plural agreement on the verb.

4.1.2.3. Results

Table 16 gives the number of virus-context ECs with plural associates used in each of the corpora. (Virus contexts are ECs in which the first NP following the verb is plural.)

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Corpus	Adult Sing.	Adult Plur.	Adult Total	Child Sing.	Child Plur.	Child Total
Adam	1	42	43	0	0	0
Allison	0	4	4	0	0	0
April	1	5	6	0	2	2
Eve	8	19	27	0	0	0
Naomi	5	12	17	9	4	13
Nathaniel	3	37	40	1	0	1
Nina	13	93	106	17	8	25
Peter	12	50	62	15	4	19
Sarah	23	12	35	10	2	12
Shem	55	8	63	9	1	10
Total	121	282	403	52	21	73

Table 16   Numbers of plural and singular verbs in ECs with plural associates in virus contexts

Adults in every corpus used ECs in virus contexts, and in all but one corpus, they used both singular and plural verbs in these contexts. The one exception is the Allison corpus, which contains only four ECs in virus contexts. Combining the results from all ten corpora, the adults used plural verbs 70% of time in virus contexts. Example of adult ECs in virus contexts using singular and plural verbs are given below.

(167) INV: it's not making any noise # that's (be)cause there's two records # if we just use one record # then it-'ll work .   (Shem 4, line 156)

(168) LOI: oh let's see # let's see # there are so many puppets here .
                                                            (Peter 1, line 740)

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Of the seven children who used ECs in virus contexts, five used both singular and plural verbs in these contexts. The two exceptions are April and Nathaniel, who used ECs in virus contexts only two times and one time, respectively. Both of April's examples used plural verbs, and Nathaniel's one example used a singular verb. The children used plural verbs 29% of the time in virus contexts. Example of child ECs in virus context using singular and plural verbs are given in (169)-(170).

(169) CHI: there's a lot of pennies in there .   (Sarah 90, line 305)

(170) CHI: now there are porches .   (Nina 34, line 388)

Table 17 gives the number of uses of ECs with plural associates in non-virus contexts.

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Corpus	Adult Sing.	Adult Plur.	Adult Total	Child Sing.	Child Plur.	Child Total
Adam	1	9	10	0	0	0
Allison	0	2	2	0	0	0
April	0	0	0	0	0	0
Eve	0	7	7	0	0	0
Naomi	1	4	5	1	0	1
Nathaniel	0	4	4	0	0	0
Nina	7	39	46	2	0	2
Peter	2	20	22	3	2	5
Sarah	13	0	13	0	0	0
Shem	2	9	11	0	0	0
Total	26	94	120	6	2	8

Table 17   Numbers of plural and singular verbs in ECs with plural associates in non-virus contexts

These include two types of sentences. In one type, the plural associate has a singular first conjunct. Since Sobin's virus would identify this singular NP as the first NP after the verb, the virus would not license plural agreement. (171) is an example of this type of sentence.

(171) CHI: yep # a snowman's [!!] coming # and there's gonna be a Christmas tree and presents   (Peter 19, line 1619)

In the second type, movement results in the associate not being the first NP after the verb. In (172), I-to-C movement causes *there* to follow the verb. According to Sobin's analysis, *there* is a singular NP, so his virus rule should not apply. In

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(173), wh-movement leaves the verb without a following NP, so the virus rule should not apply.[32]

(172) MOT: why are there so many # Adam ?   (Adam 34, line 505)

(173) FAT: hey you know what days of the week there are?
                                                (Nathaniel 21, line 506)

Adults in nine corpora and children in three corpora used ECs with plural associates in non-virus contexts. Despite being in non-virus contexts, adults used plural agreement 78% of the time and children used plural agreement 25% of the time in these sentences. All of the 32 sentences (26 adult + 6 child) from Table 17 in which speakers used singular agreement were of the type in (171)—a singular first conjunct followed the verb. All of the 96 sentences (94 adult + 2 child) in which speakers used plural agreement were of the type in (172) and (173)—the plural associate was not (or did not contain a conjunct that was) the first NP after the verb.

4.1.2.4. Discussion

In Spontaneous Speech Studies 1 and 2, we saw that children use *whom* and nominative pronouns in conjoined noun phrases at a much lower rate than adults do. In ECs with plural associates, children use plural verb forms with less frequency than adults do, but the difference between children and adults is not as pronounced as in the other virus phenomena discussed. While this may cast doubt on a virus analysis for plural ECs, it cannot be considered conclusive evidence against such an analysis. This is because we already know that viruses can differ

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[32] I assume virus rules do not apply across sentence boundaries, and so the verb in (173) has no

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with respect to how frequently children use them compared to adults. Children are further from adults in their use of *whom* than in their use of nominative pronouns in conjoined noun phrases. Given that such variation between viruses exists, it is not implausible that a virus could exist that affects children and adults even more similarly in their spontaneous speech.

More troubling for the virus analysis is the fact that speakers used plural agreement so frequently in non-virus contexts. In fact, combining the data from all child and adult speakers, plural agreement was used 75% of the time in non-virus contexts with plural associates, but only 64% of the time in virus contexts with plural associates.[33] This is completely unexpected under the view that the only way for a verb in an EC to become plural is through a grammatical virus.

Finally, recall that there was a division between two types of non-virus contexts. In the first, the verb was followed by a plural associate with a singular first conjunct. These sentences *always* had singular agreement on the verb. In the second, the plural associate was not the first NP after the verb. These sentences *always* had plural agreement on the verb. Sobin's proposed virus rule would not apply to either of these types of sentences. If such a virus rule existed and were the only source of plural agreement in ECs, we would expect to find only singular verbs in both types, and yet a clear division exists. This is support for a system in which a plural associate can, in fact, determine plural agreement on the verb within the grammar, and singular verb agreement in ECs with singular first conjuncts in the associate results from some system of first conjunct agreement. It

following NP for the purpose of virus rules.

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is still to be determined whether this first conjunct agreement results from an option of the grammar, a grammatical virus (different from Sobin's, since it would license singular agreement, as opposed to just plural agreement), or some other source, such as a processing effect.

In the following section, I argue that the possibility of plural agreement in ECs is sensitive to structural distinctions, which would not be possible if plural agreement were licensed by a grammatical virus.

4.1.3. Two types of ECs

According to Sobin's grammatical virus analysis, the possibility of a plural verb in an EC should depend only upon the plurality of the linearly following NP. We have already seen in the preceding section that this is not the case. In this section, I claim that a plural verb is possible to some extent when the linearly following NP is a singular first conjunct and argue that this possibility depends on a particular structure for the EC.

According to the evidence we have seen so far, when the associate in an EC has a singular first conjunct, plural agreement is not possible. Plural agreement in this context always received an average rating of less than 1 out of 5 in the judgments of naturalness collected by Sobin, and speakers always used singular verb forms in this context in the spontaneous speech data reported in Section 4.1.2. In Felber (2002), however, I claimed that sentences with plural verb forms in this context are grammatical, despite their very low frequency. This

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[33] Note that this does not contradict the results of Sobin's (1997) rating collection. All of the ECs with plural associates that he tested were in virus contexts.

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claim was based on a comparison of two structurally distinct types of ECs, first

discussed by Hornstein, Rosen and Uriagereka (2000). In both types, the verb is

followed by a conjunction of two singular NPs. In one type ((174)-(175)), this

conjunction "NP *and* NP" can trigger plural agreement, while in the other type

((176)-(177)), it cannot.

(174) a. There is a doctor and a lawyer in the hospital.
     b. There are a doctor and a lawyer in the hospital.

(175) a. There is a dog and a cat with that man.
     b. There are a dog and a cat with that man.

(176) a. There is a right side and a wrong side to every argument.
     b. * There are a right side and a wrong side to every argument.

(177) a. There is a major problem and a minor problem with your solution.
     b. ?* There are a major problem and a minor problem with your solution.

<div align="right">(Felber 2002: 17)</div>

My consultants varied in whether they preferred a plural or a singular verb

in (174) and (175); most preferred the singular, but one preferred the plural. All

speakers agreed that the plural was at least possible, though. On the other hand,

the consultants found a plural verb to be much worse in (176) and (177)[34]. The

difference between the two sets of examples ((174)-(175) versus (176)-(177)) is

that the former belong to what Hornstein, Rosen and Uriagereka (2000) term the

Standard Interpretation (SI) ECs, and the latter to what they call the Integral

Interpretation (II) ECs.

While in the SI ECs above, the prepositional phrases give locative

information, in the II ECs, what we actually have is a relationship of inalienable

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[34] Overall, consultants found (176b) to be completely unacceptable and (177b) to be slightly better. I have no explanation for the difference between the two examples.

<div align="center">120</div>

possession or constitution. (Every argument *has* a right side and a wrong side. Your solution *has* a major problem and a minor problem.) These two types of ECs can be shown to correspond to different structures. Consider Hornstein, Rosen and Uriagereka's sentence (178), which can be either an SI or an II EC.

(178) There is a Ford T engine in my Saab.

(179) a. ...[$_{SC}$ a Ford T engine [in my Saab]]
      b. ...[$_{SC}$ my Saab [a Ford T engine]]

If (178) gets a standard interpretation, it means that somewhere, located inside my Saab (maybe in the trunk), is a Ford T engine, and it contains the small clause structure (179a). On the other hand, (178) could have the meaning that a Ford T engine is part of my Saab; this is the integral interpretation, which involves a small clause structure more like (179b). To be more precise, the II version begins with the structure (180a) and, after raising of *a Ford T engine* to [Spec DP/PP][35], ends up as in (180b).[36]

(180) a. there [be [$_{DP/PP}$ in [[$_{DPposs}$ my Saab] AGR^0 a Ford T engine]]]
      b. there [be [$_{DP/PP}$ [a Ford T engine]$_i$ in [[$_{DPposs}$ my Saab] AGR^0 t$_i$]]]

The structural difference between the two types of ECs can explain the contrast between the (b) examples in (181)-(182) and (183)-(184).

(181) a. There is believed to be an advisor with the senator.   (SI)
      b. There is an advisor believed to be with the senator.   (SI)

(182) a. There is believed to be a suspicious man in the warehouse.   (SI)
      b. There is a suspicious man believed to be in the warehouse.   (SI)

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[35] The notation DP/PP, adopted from Kayne (1993) is meant to convey that the phrase is headed by a lexical item that looks like a preposition, but that has the distribution of a DP.

[36] The motivation for this raising is not entirely clear. However, Hornstein, Rosen and Uriagereka (2000) base this derivation for II ECs on Kayne's (1993) anaylsis of English possessive constructions such as (i), in which he argues that raising of the possessed DP is related to the indefiniteness of an abstract D^0, corresponding to *in*, the head of DP/PP in (180).

(i) My Saab has a Ford T engine.

(183) a. There is believed to be a problem with this proof. (II)
　　　 b. * There is a problem believed to be with this proof. (II)

(184) a. There is believed to be a resolution to this argument. (II)
　　　 b. * There is a resolution believed to be to this argument. (II)

(Felber 2002: 14-15)

While all of the (a) examples in (181)-(184) are acceptable, only in the SI cases,

(181)-(182), are the (b) examples acceptable. In order to see how the proposed

structural differences account for this contrast, we must take a closer look at the

structures of the (a) and (b) examples. According to Lasnik (1995), the (a)

examples involve the expletive passive structure shown in (185a), while the (b)

examples involve reduced relative clauses, as in (185b).

(185) a. there$_i$ is believed t$_i$ to be [a an advisor [with the senator]]
　　　 b. there is [$_{DP}$ an advisor Op$_i$ [believed [t$_i$ to be [t$_i$ [with the senator]]]]]

This claim is based the fact that adjunct extraction is possible in the (a)-type

sentences, but not in the (b)-type, as shown in (186).

(186) a. Why$_i$ is there believed [to be an advisor with the senator t$_i$]?
　　　 b. * Why$_i$ is there [$_{DP}$ an advisor believed [to be with the senator t$_i$]]?

Given Lasnik's (1995) analysis, the reason for the ungrammaticality of (186b) is

violation of the Complex-NP constraint (or whatever is taken to account for its

effects in one's preferred syntactic theory), a problem that does not arise with the

expletive passive structure.

Now we can see that derivation of (183b) and (184b), would require the

relative operator to move into [Spec DP/PP] and then move again. However,

Horstein, Rosen and Uriagereka (2000), following Kayne (1993), take this second

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movement to be improper movement. The problematic movement is indicated in (187).

(187) * there is a resolution Op_i believed [t_i to be [$_{DP}$ t_i to [[$_{DPposs}$ this argument]

AGR^0 t_i]]]
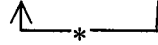
Other effects of the structural differences between SI and II ECs can be found. For example, Hornstein, Rosen and Uriagereka (2000) point out the contrast in (188)-(191)..

(188) With which senator is there an advisor?   (SI)

(189) In which building is there a suspicious man?   (SI)

(190) * With which proof is there a problem?   (II)

(191) * To which argument is there an acceptable resolution?   (II)

In Felber (2002), I argued that, given the II structure, the ungrammaticality of (190)-(191) can be accounted for by a representational version Fiengo's (1977) proper binding condition, according to which a trace must have a c-commanding antecedent. Derivations for (189) and (191) are given in (192) and (193), respectively. We can see that in the II case, t_i does not have a c-commanding antecedent after movement of *to which argument.*

(192) a. there is [[$_{NP}$ a suspicious man] [$_{PP}$ in [which building]]]
      b. [$_{PP}$ in [which building]]$_i$ [is there [[$_{NP}$ a suspicious man] t_i]

(193) a. there is [$_{DP}$ [an acceptable resolution]$_i$ [to [[$_{DPposs}$ which argument] AGR^0
      t_i]]]]
      b. * [to [[$_{DPposs}$ which argument] AGR^0 t_i]]$_k$ [is there [[$_{DP}$ an acceptable
      resolution]$_i$ t_k]]]

We have seen that SI and II ECs have structural differences whose effects can be seen in other areas of the grammar. It appears that the structural

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differences between the two types of ECs affect their agreement possibilities. Recall the distinction in (174)-(177), repeated below.

(174) a. There is a doctor and a lawyer in the hospital.
b. There are a doctor and a lawyer in the hospital.

(175) a. There is a dog and a cat with that man.
b. There are a dog and a cat with that man.

(176) a. There is a right side and a wrong side to every argument.
b. * There are a right side and a wrong side to every argument.

(177) a. There is a major problem and a minor problem with your solution.
b. ?* There are a major problem and a minor problem with your solution.

Plural agreement is sharply degraded in II ECs with conjoined associates, However, the structural differences between SI and II ECs have the power to affect the possibility of plural agreement *only* if this agreement is sensitive to structure. In other words, if plural agreement in ECs is caused by a grammatical virus, there is no reason that the SI/II distinction should have any effect on it.

We can account for the observed agreement pattern by combining an analysis in which the associate in an EC shares agreement features with the verb—either through direct agreement (Chomsky 1986, 2000), or because it transmits features through (Chomsky 1993) or shares features with (Lasnik 1995; Bošković 1997) *there*—and the processing account of first conjunct agreement adopted in Schütze (1999).

I assume that the associate of *there* is the phrase bearing partitive Case (Belletti 1988) that is structurally closest[37] to it. In the SI EC in (194a), which has the structure (194b), the associate is the phrase "a doctor and a lawyer." The SC does not bear Case.

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(194) a. There are a doctor and a lawyer in the hospital.
     b. There are [$_{SC}$ [$_{NP}$ [$_{NP}$ a doctor] [$_{BP}$ and [$_{NP}$ a lawyer]]] [$_{PP}$ in the hospital]]

In the II EC in (196a), which has the structure in (196b), *a right side and a wrong side to every argument* is a DP; it can bear partitive Case and is the associate of *there*. This DP appears to be singular, even if it contains a plural NP:

(195) A major problem and a minor problem to your solution has/?have been found.[38]

If this type of DP is always singular, then it becomes clear why plural agreement is impossible in (196), but possible in (194).

(196) a. There is a right side and a wrong side to every argument.
     b. there [is [$_{DP}$ [a right side and a wrong side]$_i$ to [[$_{DPposs}$ every argument] AGR^0 t$_i$]]]

     What this does not explain is the tendency for the verb in an EC to agree with the linearly following NP in the surface string. This is true in both SI and II ECs, as illustrated in (197)-(200), where the preferred forms are underlined..

(197) There is/are a doctor and a lawyer in the hospital.

(198) There is/are doctors in the hospital.

(199) There is/are a right side and a wrong side to every argument.

(200) There is/are two sides to this argument.

The analysis discussed above accounts for the preferred forms in (198) and (199), but not for those in (197), where the associate *a doctor and a lawyer* is plural, or

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[37] Structural closeness can be determined by counting nodes in a phrase structure tree.

[38] Plural agreement is not completely impossible here, and I currently have no explanation for this. However, my consultant finds the singular verb form better than the plural one. Certainly, singular agreement is better here than in (i), with a plural NP subject:

(i) *John and Bill has left.

It also remains to be explained by a plural verb form is strongly preferable in (ii).

(ii) Two problems with your solution have/*has been found.

Clearly there is still more work to be done in understanding the agreement properties of the type of DP under investigation.

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(200), where the associate *two sides to this argument* is singular (as a possessive DP). Following Schütze (1999), I attribute these to a tendency in processing to allow a verb to agree with a linearly close NP. This tendency has been well-documented, for example, in Bock and Miller (1991). What may come as a surprise is that the processing effect is so strong, particularly in (200). In Felber (2002), I suggested that the ability of a speaker to overcome a processing effect is related to the speaker's ability to think metalinguistically about the structure in question:

> It is a hallmark of processing errors that they can be overcome. Upon reflection, speakers are able to assign a grammatical structure to the garden path-inducing (i) and will concede that a plural verb form would be more appropriate in (ii).
>
> (i) The horse raced past the barn fell.
> (ii) Where is the kid and his mother?
>
> I propose some processing errors may be strong enough to overcome the grammar, and furthermore, that the reason speakers can overcome processing errors in cases like (i) and (ii) is that they are able to use meta-linguistic reasoning to convince themselves of the result. It is not very difficult to convince the average speaker that in English, subjects agree with verbs and that in (ii), the subject is plural.[39] On the other hand, it may be quite difficult for a speaker to perform this type of reasoning when dealing with ECs. Imagine trying to convince the average speaker that logically, [II ECs with plural post-verbal NPs, e.g. (200)] should have singular verbs! With a strong processing tendency (strong enough to overcome the grammar) to produce and accept the plural form in these examples, and in the absence of a clear logical way to convince oneself otherwise, the plural form dominates.

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[39] In an informal experiment, I found several speakers who accepted the sentence *Which boys do Mary like*, where the verb agrees with an NP other than its subject. I tried to convince each of these speakers that the correct form should be *Which boys does Mary like.* I had success with some speakers, but not with others. This is consistent with the suggestion that overcoming processing errors is a matter of meta-linguistic reasoning. Some of the speakers may have been more skilled at this than others.

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Finally, I must mention that there does seem to be a possibility of using a singular verb form in all declarative ECs, whether they have singular or plural associates. Recall that in the spontaneous speech study, speakers used singular verb forms 36% of the time in virus contexts—that is, when the first NP to the right of the verb was plural. While some of these uses may be in II ECs, this is certainly not the case for all of them. In any case, examples in SI ECs, such as (201) from Chomsky (1995), are well documented.

(201) There's three books on the table.

Schütze (1999) considers the possibility that it is actually singular agreement in ECs that is caused by a grammatical virus simply allowing *is* after *there;* however, he ultimately rejects this idea for many of the same reasons that he rejects a virus analysis of plural ECs: The phenomenon does not display the signature properties of a grammatical virus. For example, when phonologically reduced, a singular verb can appear before *there* in an EC with a plural associate, which Schütze illustrates with the two examples in (202).

(202) a. How many calories 's there in a Tic Tac?
      b. 'S there any cookies in the cupboard?   (Schütze 1999: 475)

A *there's* virus would also be unusual in that, unlike the other grammatical viruses we have seen, there is certainly no prescriptive or social pressure to use a singular verb form in ECs.

Instead of a virus analysis, Schütze proposes that the expletive *there* may have either singular agreement features or no agreement features. If it has singular agreement, it agrees with the verb, and if it lacks agreement, the verb agrees with

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the associate. Note that this is inconsistent with analyses of agreement in ECs in which the associate must share agreement features with the expletive (Lasnik 1995; Bošković 1997). Either an analysis in which the associate can agree directly with the verb (Chomsky 1986, 2000) or in which the associate can transmit agreement features to an expletive *there* that lacks them would be required (Chomsky 1993).

4.1.4. No grammatical virus for agreement in ECs

Sobin (1997) showed that in declarative ECs, plural agreement is preferred exactly when the NP linearly following the verb is plural. However, as seen in Section 4.1.2, an interrogative EC with a plural associate is very likely to have a plural verb form, despite the fact that *there*, and not the associate, directly follows the verb. In addition, despite the strong preference for (singular) first conjunct agreement in ECs with conjoined singular NPs following the verb, speakers distinguish between two types of ECs. In SI ECs of this type, plural agreement is possible, while in II ECs it is not. Although the two types of ECs differ structurally, they appear the similar on the surface; they do not have surface differences to which a grammatical virus would be sensitive.

Recall that plural agreement in ECs has two properties that made it look like a grammatical virus. It is sensitive to linear order, in that an associate with a plural second conjunct does not trigger plural agreement as strongly as an associate with a plural first conjunct. Since any phrase consisting of two conjoined NPs would trigger plural agreement in overt subject position in English,

we can also say that plural agreement in ECs underextends. However, as we have seen, these effects are simply preferences which can be explained by viewing first conjunct agreement as a processing effect. That a processing effect is sensitive to the linear order of words is not surprising. Plural agreement in ECs is not the result of a grammatical virus.

4.2. Preposition placement

In English, preposition pied-piping and preposition stranding co-exist. This results in prescriptive pressure toward one of the options: preposition pied-piping. One might wonder, therefore, whether this leads to a grammatical virus affecting preposition placement in English. I will examine two proposals for how a grammatical virus could affect preposition placement. In section 4.2.1, I will consider McDaniel, McKee and Bernstein's (1998) proposal that preposition pied-piping in English is the result of a grammatical virus. In section 0, I discuss sentences with "extra" prepositions in them (eg. *That is the man to whom I talked to*), and consider the possibility that this phenomenon is caused by a grammatical virus.

4.2.1. Preposition pied-piping as a potential grammatical virus
4.2.1.1. McDaniel, McKee and Berstein's (1998) proposal

McDaniel, McKee and Bernstein (1998) make an appeal to a grammatical virus to account for the fact that there are two possibilities for preposition placement in English relative clauses.

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(203) That is the man with whom I spoke.
(204) That is the man who(m) I spoke with.

Assuming a movement analysis of the relative clauses in (203) and (204), in (203), *whom* pied-pipes the preposition *with* to the front of the clause, while in (204), *with* is stranded in its original position.

McDaniel et al. (1998) note that this alternation presents a problem for Minimalist syntactic theory. One of the recurring themes in Minimalist syntax has been the absence of optionality. Syntactic operations occur exactly when they must occur for convergence. Whenever it appears that an operation occurs optionally, some other explanation is desired.

The claim made by McDaniel et al. (1998) is that only preposition stranding is allowed by the English grammar, and a grammatical virus produces pied-piping of prepositions. Thus, the appearance of optionality is due to the existence of a grammatical option and a grammatical virus option, akin to the *who/whom* alternation. The authors use production and judgment data to support this position.

In the production study, a task modeled after one used by Hamburger and Crain (1982), Crain et al. (1990) and McKee et al. (1990), relative clauses were elicited from subjects in four age groups: young (3;5-5;11), middle (6;3-8:11), old (9;1-11;11), and adult. Situations were set up to encourage subjects to use relative clauses with either preposition pied-piping or preposition stranding. For example, in one situation, there are two pigs, and Minnie Mouse jumps over one of them. The subject has to identify that pig. Of interest is whether the subject will say *the*

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pig that/which Minnie Mouse is jumping over or *the pig over which Minnie Mouse is jumping*. The three target relative clauses with PPs in the study are:

(205) a. the plane that Spot is barking at / the plane at which Spot is barking
b. the pig that Minnie Mouse is jumping over / the pig over which Minnie Mouse is jumping
c. the girl that the giraffe is sitting on / the girl on whom the giraffe is sitting

The subjects successfully produced 253 object-of-preposition relatives. Of these, 100% contained preposition stranding; no subject in any age group ever used preposition pied-piping.

The other study conducted by McDaniel et al. was a grammaticality judgment task (McDaniel and Maxfield 1992; McDaniel et al. 1995). The same subjects who participated in the production task also participated in the grammaticality judgment task. In this task, subjects heard sentences spoken by one of the experimenters and had to say whether the sentences sounded "right" or "wrong" as sentences of English. The sentences relevant to the current discussion included sentences with preposition stranding in relative clauses, such as (206), and sentences with pied-piping of prepositions in relative clauses, such as (207).

(206) This is the woman who Grover talked to.
(207) This is the woman to whom Grover talked.

Each subject was presented with two sentences of each type. A subject who accepted both sentences of a particular type was classified as accepting that construction, and a subject who rejected both sentences of a particular type was classified as rejecting that construction. A subject who accepted one sentence and rejected another sentence of a particular type heard a third sentence of that type, and then was classified as accepting or rejecting that construction based on the

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response to the third sentence. Table 18 shows the percentages of subjects in each age group who were classified as accepting each of the constructions.

Sentence Type	Young 3;5-5;11	Middle 6;3-8;11	Old 9;1-11;11	Adult
Preposition stranding	94	100	100	100
Preposition pied-piping	6	17	54	90

Table 18   Percentage of subjects classified as accepting preposition stranding and pied-piping in relative clauses

To summarize the results from McDaniel et al.'s production and judgment studies, no subject in any age group produced relative clauses with preposition pied-piping, but subjects in every age group produced relative clauses with preposition stranding. In the judgment task, subjects in every age group accepted relative clauses with preposition stranding at a high rate. Very few subjects in the "young child" group accepted relative clauses with preposition pied-piping (6%), but the acceptance increased for each successive age group, eventually reaching 90% for the adults.

McDaniel et al. take the production data to indicate that preposition stranding is the only grammatical option in English. They claim that preposition pied-piping is caused by a grammatical virus, which they take not to affect subjects in their young child group and to affect more and more subjects as age increases.

4.2.1.2. Objections

Despite the appeal of McDaniel et al.'s analysis, there are several reasons to question the claim that a grammatical virus causes preposition pied-piping in English.

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The first problem concerns McDaniel et al.'s expectations for children's behavior. They assume that young children will not produce or accept virus forms. This may have seemed like a reasonable assumption at the time, given that a major source of virus input is in written language and in prescriptive grammar teaching; it can be assumed that young children have not had extensive input from either of these sources. However, as shown in Chapter 2 in the discussions of *whom* and nominative pronouns in conjoined noun phrases, young children often do accept grammatical virus forms. I attributed this to sparse input they receive from adults using virus forms. I argued that young children had heard enough input to formulate very general virus rules that would later be refined. Given this result, McDaniel et al.'s acquisitional argument for preposition pied-piping as a grammatical virus is weakened. The behavior of the young children in their judgment study is not aligned with the behavior of children of a similar age in my judgment study of known grammatical viruses. Note that this only weakens McDaniel et al.'s claim, but does not disprove it. Given that the adults in their study did not produce preposition pied-piping, it may be that the structure is produced by a virus for which young children have no evidence.

A second problem with analyzing preposition pied-piping as a grammatical virus is that the virus would have an effect identical to that of a grammatical process. In many languages of the world, preposition pied-piping is the only option available. For example, Russian is in this category, as shown by the following example, from Abels (2003).

(208) Ot čego sleduet otkazat'sja?
     of what follows give up-self
     'What should one give up?'

(209) *Čego sleduet otdazat'sja ot?
     what follows give up-self of

Preposition pied-piping in Russian and in other non-stranding languages is characterized by a preposition appearing with a wh-phrase in a position other than the one in which it was merged, and a corresponding gap in the merged position.

It appears that McDaniel et al. are proposing a grammatical virus that produces exactly the same effects as preposition pied-piping in the grammar of certain languages. This is in contrast with other known viruses, which cannot perfectly mimic grammatical operations and therefore overextend or underextend. For example, recall (30), a common hypercorrection related to the "*and I*" virus. Recall also (35h), which we would expect to be acceptable if *whom* were part of the grammar of English, and (36a), a slipper that is disallowed by prescriptive grammar.

(30) This is between you and I.

(35) h. * Whom for?

(36) a. We feed children whom we think are hungry.

It does not seem that it would be possible to have a grammatical virus that *did* conform perfectly to the prescriptive standard and/or the grammatical process it mimicked. Recall that viruses are perpetuated as viruses because they are unlearnable as part of the grammar. If a virus produced precisely the effects of preposition pied-piping, an option of UG, it seems that language learners who

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heard virus input would simply acquire preposition pied-piping as part of their grammars.

McDaniel, McKee and Bernstein do mention, in a footnote, three sentences that they took from university students' writing, the first two of which they suggest could demonstrate "overextension of an 'in which' rule (e.g. use *in which* as a relative pronoun)...." These three sentences are given in (210)-(212).

(210) The subset principle is a learning strategy in which everyone is born with.

(211) The quiz the students took was one in which the students created for themselves.

(212) ...two clear water bottles on which I placed a red sticker on one and a blue sticker on the other.

To the extent that pied-piping is acceptable in English, it is fairly general, applying to many different prepositions and wh-words. If, as the authors suggest in their footnote, an "in which" virus contributes to both pied piping and its overextension in (210)-(211), there would have to be dozens of such viruses to account for all the possible combinations of "preposition + *wh-* word" in English pied-piping. In addition, a rule that used 'in which' as a relative operator instead of 'which' would produce the overcorrections in (210) and (211), but it would not produce normal cases of pied-piping, since it is not able to delete a stranded preposition. In other words, it could produce (213), but not (214).

(213) That is the room in which we met in.

(214) That is the room in which we met.

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Although an "in which" rule will not account for all cases of preposition pied piping possible in English, in section 0, I will consider a similar rule that could account for the examples in (210)-(212).

A third problem for a virus analysis of preposition pied-piping concern's the interaction of pied-piping with the grammar. According to the model given in Chapter 3, grammatical viruses apply to grammatical outputs of the grammar, after all grammatical operations are complete, and a grammatical virus cannot create an acceptable sentence out of an ungrammatical one. Preposition pied-piping, on the other hand, can "rescue" an ungrammatical sentence.

Stranding a preposition in a temporal adjunct, as in (215), is deviant for many speakers (Huang 1982). I confirmed this with several consultants.[40]

(215) *? Which speech did you leave during?

However, if the preposition is pied-piped, all of my non-linguist informants reported an improvement in acceptability:

(216) During which speech did you leave?

If preposition pied piping were licensed by a grammatical virus, then (216) should be just as bad as (215). The fact that pied-piping can improve an unacceptable sentence is evidence that pied-piping is not the result of a grammatical virus and, in fact, may be part of the grammar of English.[41]

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[40] I focus here on the judgments of non-linguist consultants. Linguists tend not to find (215) as deviant as non-linguists do. William Snyder (p.c.) suggests that his may be an effect of syntactic satiation (see Hiramatsu 2000; Snyder 2000).

[41] The fact that a phenomenon can improve the acceptability of a sentence, while ruling out a virus analysis in my system, does not automatically imply that that phenomenon is part of the grammar. For example, in English, resumptive pronouns can improve the acceptability of certain sentences:
(i) * That is the boy who I wonder whether left.
(ii) ? That is the boy who I wonder whether he left.

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Finally, a serious problem for analyzing preposition pied-piping as a grammatical virus is that for such an analysis to be tenable, there must be a way to state the propsed virus rule. Other than the suggested "in which" rule discussed above, McDaniel et al. offer no proposal for how a pied-piping virus might be stated, and attempts to construct one reveal further theoretical problems. While the other grammatical viruses we have seen simply affect word form in certain environments, a virus that produced the sentence in (217) would need to either produce or mimic movement of a preposition, not only inserting it before *whom,* but also deleting it from its sentence-final position.

(217) This is the woman to whom Grover talked.

We can immediately reject the possibility of a grammatical virus producing actual syntactic movement. We have seen evidence that grammatical viruses operate on surface forms, after all syntactic movement has taken place. That is why (35h), *whom for?*, is unacceptable. Although *whom* originates after the preposition *for* (where the Basic 'whom' Rule would license it), the virus does not apply until after movement of *whom*, which destroys the licensing environment.

I have also suggested that grammatical viruses are limited in their actions to transforming the pronunciations of lexical items. However, let us suppose for a moment that this is incorrect, and consider the possibility that a pied-piping virus effects a more 'surfacy' kind of movement—one that changes the order of lexical

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Despite this improvement, it is still possible that resumptive pronouns are not part of the grammar of English, but effect an improvement in acceptability by assisting in processing.

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items after all structural operations are complete. We could state this rule as in (218).

(218) Preposition Pied-Piping virus: Surface Movement 1
     If: *wh*- .... preposition
          1   2   3
     Then: 1 2 3 → 3 1 2

This virus would actually have to be a bit more refined than it is in the statement above. We clearly do not want words being moved around *any time* a *wh*- word is followed by a preposition, as demonstrated in (219).

(219) a. This is the book which belongs on the shelf.
      b. ! * This is the book on which belongs the shelf.

We might try to avoid this problem by adding a prosodic break to the context for the virus, as in (220).

(220) Preposition Pied-Piping virus: Surface Movement 2
     If: *wh*- .... preposition (break)
          1   2   3   4
     Then: 1 2 3 → 3 1 2

What (220) tries to capture is that we often find stranded prepositions at the ends of clauses (which often coincide with prosodic breaks). The rule correctly fails to apply to (219a); however, it will incorrectly fail to apply to other sentences in which stranded prepositions appear sentence-internally, such as in (221a).[42]

(221) a. This is the room which Ryan hid in yesterday.
      b. This is the room in which Ryan hid yesterday.

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[42] I am assuming here that a person who accepts preposition pied-piping in (i) will also accept it in (ii).
(i) This is the room in which Ryan hid.
(ii) This is the room in which Ryan hid yesterday.

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It does not seem that there is a way to state this grammatical virus such that it applies in (only) the right places without making reference to the grammatical relationship between the *wh*-word and the preposition.

A further problem for a pied-piping virus of this type is that it cannot make certain necessary distinctions about when a preposition can be pied-piped and when it cannot. One place where pied-piping is not possible in English is when it would split a verb-particle construction. Examples of a verb-particle construction are *look up* and *point out* as in (222) and (223).

(222) Angel will look up the number.

(223) Angel will point out the mountain.
As shown in (224) and , the particles of verb-particle constructions cannot be pied-piped.

(224) a. Which number did you look up?
       b. * Up which number did you look?

(225) a. Which mountain did you point out?
       b. * Out which mountain did you point?   (Johnson 1991: 597)

Although the particles *up* and *out* are homophonous with prepositions in English, they do not function as prepositions when they are in verb-particle constructions. However, it is not clear that a person applying the virus rule in (220) would distinguish between *up* and *out* as prepositions and *up* and *out* as particles. One might expect such a person to produce sentences like (224b) and (225b); however, this does not strike me as an overcorrection that people actually make. On the other hand, if preposition pied-piping is part of the grammar of English, the unacceptability of (224b-c) is readily explained by taking the verb and particle(s)

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of a verb-particle construction to form a complex verb, as argued in Johnson (1991), for example.

Suppose that when a relative operator originates in a PP, it can either move alone or pied-pipe the whole PP. Then, starting from (226a), we get the two options (226b)—stranding, and (226c)—pied-piping.

(226) a. He ran [PP up [which street]]
       b. Which$_i$ street did he run [PP up t$_i$]] ?
       c. [PP Up which street]$_i$ did he run t$_i$?

A sentence with a verb-particle construction has a different structure. In one proposed structure, argued for by Johnson (1991), among others, the verb and particle comprise a complex verb in the syntax. In this structure, there is no PP for the relative operator to take along when it moves, and so (227b) is the only possible result after movement of *which*.

(227) a. He [V looked up] which number
       b. Which number$_i$ did he [V look up] t$_i$]

A pied-piping mechanism that is internal to the grammar can recognize the relevant structural distinctions between (226) and (227).

I have argued that preposition pied-piping is available in the grammar of English. Why, then, was it never produced in McDaniel, McKee, and Berstein's (1998) elicited production study? And did young children fail to accept it in their judgment study? I propose that both of these results are reflexes of the fact that preposition pied-piping, while part of the grammar of English, belongs to a formal register: It is more likely to be used in literary, work, and other formal settings. This is discussed, for example, by Murphy (1995), who contrasts the informal (228), which he labels as unacceptable, with the more formal (229).

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(228) * To who did you talk?

(229) To whom am I speaking?

According to Murphy, the formal register of English has its own grammar and lexicon. (228), he claims, is unacceptable because preposition pied-pied piping is only available in the formal register of English, and the use of *who* with objective case or the lexical item *talk* are not part of that register. Although not wishing to commit to a system in which different registers of English have completely different grammars, I do accept the claim that preposition pied-piping belongs to a formal register and is more likely to be used when other formal aspects of the language are employed.

The sentences that McDaniel et al. elicited did not call for a formal register. It is hard to imagine talking formally about Minnie Mouse jumping over a pig. Thus, neither adults nor children employed preposition pied-piping. I propose, in fact, that young children will rarely, if ever, produce preposition pied-piping, either because they are rarely placed in formal situations, or if they are, they are not fully aware of the formality of the situation and the associated formal register. In the following study, I look at adults' and children's use of preposition pied-piping and preposition stranding in spontaneous speech. The expected result is that children will not use pied-piping, and adults will rarely do so, since child-directed speech does not usually call for a formal register.

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4.2.1.3. Spontaneous Speech Study 4: Preposition pied-piping in child and adult

speech

4.2.1.3.1. Method

I searched the same ten CHILDES corpora used in the other spontaneous speech studies. The Clan program *combo* was used to extract all utterances that included a *wh*-word and a preposition. The results were then searched by hand to find those that included either preposition pied-piping or preposition stranding and coded as either child or adult utterances. The reason for only including stranding sentences with *wh*- words was that finding all instances of preposition stranding (with or without *wh*-word) would require first extracting all utterances with prepositions and then searching these by hand to find those in which a preposition is stranding. The sheer number of utterances with prepositions in the corpora makes this task unmanageable.

In the utterances reported, only sentences that clearly show that a preposition has been stranded or pied-piped are included. This eliminates the common utterance (230), which could be a frozen form not involving movement.

(230) What for?

Sentences like (231), which also use *what for* to mean *why*, but have intervening material, are included.

(231) What did you do that for?

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4.2.1.3.2. Results

Table 19 reports the number of uses of preposition pied-piping by children and adults in each of the ten corpora.

Corpus	Adult	Child	Total
Adam	7	0	7
Allison	0	0	0
April	0	0	0
Eve	1	0	1
Naomi	0	0	0
Nathaniel	0	0	0
Nina	8	0	8
Peter	0	0	1
Sarah	0	0	0
Shem	0	0	0
Total	16	0	16

Table 19   Uses of preposition pied-piping in CHILDES corpora

Preposition pied-piping was very rare for all speakers. While some adults occasionally used preposition pied-piping, children never did. Some examples of the reported utterances are given below.

(232) MOT: to whom is he saying <hi> ["] ?   Nina 29, line 1330

(233) COL: we were having a great long argument in which Eve was insisting she was a boy and I was insisting she was a girl.   Eve 19, line 1432

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(234) MOT: # to why do you want to smoke?   Adam 9, line 581

The example given in (234) looks a bit like the type of example discussed by McDaniel et al. as an overcorrection; however, it is possible that this was a transcription error (including possible failure to code a restarted utterance). It is the only example found of its type.

Table 20 gives the number of uses of preposition stranding by children and adults in each of the ten corpora.

Corpus	Adult	Child	Total
Adam	177	238	415
Allison	3	0	3
April	18	4	22
Eve	25	1	26
Naomi	54	5	59
Nathaniel	62	4	66
Nina	293	23	316
Peter	86	5	91
Sarah	231	24	255
Shem	109	20	129
Total	1058	324	1382

Table 20   Uses of preposition standing in CHILDES corpora

Use of preposition stranding was common for adults, with differences usage across corpora mostly reflecting the size of the corpora. (For example, the Allison

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corpus includes only six transcripts.) All target children except Allison used preposition stranding in their corpora, but some did so with greater frequency than others. Notably, Adam had 238 instances of preposition stranding. Some examples of stranding utterances counted in Table 20 follow.

(235) LOI: what does it look like?   Peter 19, line 719

(236) CHI: what is dis from?   Adam 33, line 1411

(237) MOT: what is it attached to?   Nina 39, line 1006

Many of the stranding utterances found in the transcripts do not correspond to acceptable pied-piping utterances. In most cases, the reason for this is that the verb+preposition sequences are common combinations which can be analyzed as complex verbs. (235), with the complex verb *look like*, falls into this category, as shown by the unacceptability of (238).

(238) * Like what does it look?

4.2.1.3.3. Discussion

As anticipated, adults use preposition pied-piping very infrequently in child-directed speech, and children, in fact, never used it in the samples examined. This is not surprising given that, in McDaniel et al.'s (1998) production study, neither adults nor children produced preposition pied-piping. Although McDaniel et al. took this result to support a grammatical virus analysis of preposition pied-piping, it is also consistent with an analysis in which preposition pied-piping is part of the grammar of English, but belongs to a formal register.

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What was the source of the pattern that McDaniel et al. found in their judgment study? Recall that in their study, subjects judged sentences like *This is the woman who Grover talked to* and *This is the woman to whom Grover talked.* Subjects in all age groups accepted preposition stranding sentences at a high rate. Sentences with preposition pied-piping were accepted by only 6% of subjects in the youngest age group. Acceptance increased with age, until reaching a level of 90% acceptance by the adult group. McDaniel et al. attributed this pattern to the presence of a grammatical virus. But I have shown that young children sometimes *do* accept virus forms. Instead, I proposet that McDaniel et al.'s results have to do with the fact that *whom* was used in their pied-piping sentences. This could affect judgments in two ways. First, although children sometimes accept sentences with *whom,* sometimes they do not. This could have depressed young children's acceptance of the pied-piping sentences. Second, the results could be a reflection of the sensitivity of subjects to the cues signaling the felicity of using the formal register to which preposition pied-piping belongs. One such cue is use of the form *whom.* Though not a virus form, preposition pied-piping shares with virus forms the property of being most often found in formal speech. If awareness of this develops with age, McDaniel et al's results can be accounted for.

In the judgment study below, the first part of a two-part judgment study on preposition placement, I collect acceptability judgments of preposition stranding and preposition pied-piping where none of the sentences contain *whom.* Once this cue for formality is removed, we expect to see a decrease in adults' acceptance of preposition pied-piping. We may also see an increase in young children's

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acceptance of preposition pied-piping, since having the virus form *whom* is not required for acceptance of pied-piping in the experiment.

4.2.1.4. Experiment 3a: Preposition pied-piping in acceptability judgments

4.2.1.4.1. Method

The task for the experiment was acceptability judgment, with a method identical to that reported for Experiments 1 and 2. Recall that this involved 72 subjects split into five age groups. Each gave binary acceptability judgments for two sentences with preposition pied-piping and two with preposition stranding:

(239) a. I know with which girl Carrie played.
       b. I know with which friend Ernie ate.

(240) a. I know who Carrie walked with.
       b. I know which one Smurfette went swimming with.

All of the sentences use embedded questions, rather than relative clauses. As discussed above, it was important to the experiment not to use *whom* in the sentences. *Which*-phrases were used instead. In my own intuition however, this replacement was more natural in embedded questions (241) than in relative clauses (242). Therefore, only embedded questions were used.

(241) a. I know which friend Johnny played with.

      b. I know with which friend Johnny played.

(242) a. ?? That is the friend which Johnny played with.

      b. ?? That is the friend with which Johnny played.

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Although thus far our discussion of preposition pied-piping has focused on relative clauses, everything that has been said can be easily transferred to embedded questions.

4.2.1.4.2. Results

Sentence Type	Kinder.	Elem.	Middle	High	College
Pied-piping Ex. I know with which girl Carrie played.	36%	23%	20%	27%	43%
Stranding Ex. I know who Carrie walked with.	82%	77%	77%	70%	80%

Table 21   Percentage of tokens accepted of pied-piping and stranding

4.2.1.4.3. Discussion

Preposition stranding was accepted at a fairly high rate—between 70% and 80% for all subject groups. It is not clear why acceptance was not higher; one possibility for subjects in older age groups is that they were affected by remembering a prescriptive rule prohibiting ending a sentence with a preposition. Acceptance of preposition pied-piping was much lower for all age groups.

Recall that McDaniel et al. reported the percentage of subjects classified as accepting preposition pied-piping on a two-out-of-three criterion. On the other hand, for Experiment 3a, I reported the percentage of tokens of preposition pied-piping accepted. This means that the difference between my kindergarten subject group and McDaniel et al.'s young child subject group is not as great as it appears. 6% of their youngest group were classified as accepting pied-piping, and 14% of the children in my youngest group accepted pied piping in each of the two

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tokens they heard. On the other hand, this difference in reporting means that the difference between the adults in the two studies is even greater than it first appears. 90% of McDaniel et al.'s adult subjects were classified as accepting preposition pied-piping; only 20% of my college subjects accepted it consistently.

So, even after adjusting for the different ways of reporting results in the two experiments, my youngest subjects accepted preposition pied-piping at a lower rate than McDaniel et al.'s youngest subjects, and my oldest subjects accepted pied-piping at a higher rate than their oldest subjects. These results support the discussion above concerning the effects of *whom*.

4.2.1.5. Conclusion

Despite being part of a formal register, preposition pied-piping is part of the grammar of English. Subjects' acceptance of preposition pied-piping depends upon a number of factors—for example, the felicity of using a formal register and the subject's sensitivity to cues signaling the felicity of such use (which may increase with age). In addtion, For example, in the McDaniel et al. study, some children may have rejected pied-piping sentences because of the use of *whom* in those sentences. Also note that in both studies, all utterances were in informal contexts. These informal contexts could be the source of adults' low rate of acceptance of pied-piping in the current study; in the McDaniel et al. study, the presence of *whom* may have elevated adults' acceptance of preposition pied-piping.

Neither adults nor children frequently produced preposition pied-piping in either McDaniel et al.'s elicited production task or in the spontaneous speech corpora I examined (although some adults occasionally did so in the spontaneous speech). Two major reasons for this are: (a) the informal settings in which production occurred, and (b) the impossibility of pied-piping with the common verb+preposition sequences analyzed as complex verbs in English.

McDaniel et al. claim that the co-occurrence of preposition stranding and preposition pied-piping is a problem for Minimalism. According to Minimalist assumptions, there are no optional operations; there should be one optimal output from a given numeration. However, even in McDaniel et al.'s examples, the pied-piping examples and the stranding examples arguably start from different numerations: the former use *whom* and the latter use *who*. Although this difference should not affect syntax, according to the virus theory of *whom* developed in this dissertation, there could be other differences in the numerations of pied-piping and stranding sentences. (And in fact, to pursue this type of analysis, there must be other differences to account for optional pied piping in sentences not involving *who(m)*, eg. *With which expert did you consult? / Which expert did you consult with?*) This is the type of analysis pursued by Foley and Fugget-Fuller (2002), who argue that both options are available in the grammar of English, the difference between them arising from the distribution of features across lexical items.

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4.2.2. Extra prepositions as a potential grammatical virus

Although I have rejected the proposal that preposition pied-piping is caused by a grammatical virus in English, I will consider the possibility that a grammatical virus affects a related phenomenon in proposition placement. Here I refer to the overcorrections noted by McDaniel et al. (1998), and repeated below.

(210) The subset principle is a learning strategy in which everyone is born with.

(211) The quiz the students took was one in which the students created for themselves.

(212) ...two clear water bottles on which I placed a red sticker on one and a blue sticker on the other.

Other authors have noted similar sentences in production. For example, Rudin (1986) discusses three types of sentences with unusual preposition placement, exemplified by (243)-(245).

(243) That is the man with whom I spoke with.

(244) That is the man to whom I spoke with.

(245) That is the man to whom I met.

In (243), the preposition *with* appears both in the pied-piping position and the stranding position. Again, in (244), a preposition appears in each position, but this time, the prepositions are not the same. In (245), a preposition appears before *whom*, but this preposition does not seem to belong in the sentence at all. Rudin argues that these constructions should not simply be considered as performance errors: She cites a conversation with a student who used a sentence similar to (243) in a paper. This student insisted that the sentence sounded "more sophisticated" than a version with the preposition only at the end of the relative

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clause, and that a version with the preposition only at the beginning was "funny sounding." Rudin's approach is to argue that the constructions in question are part of the grammar of English. I will consider the possibility that they come not from the grammar (or from performance errors), but from a grammatical virus.

The virus in question would produce no movement of any kind and, instead, would insert a preposition before a *wh-* word. We could state the virus like this:

(246) Preposition Pied-Piping virus: Insert Preposition
    If: *wh-*
    Then: *wh-* → preposition *wh-*

Note that the virus rule is not consistent with my previous claim that viruses change specific lexical items to other specific lexical items. Instead, it changes a word belonging to a certain class (i.e., *whom, which, what,* etc.) to one of another class (i.e., *to-whom, in whom, in-which, of-which, with-what,* etc.) This idea, while inspired by that of McDaniel, McKee and Bernstein, is quite different from what they seemed to have in mind when suggesting the preposition pied-piping is caused by a grammatical virus. The virus I am considering here would produce only overcorrections; it would not produce normal pied-piping constructions like (203).

(203) That is the man with whom I spoke.

In order to produce this regular pied-piping sentence, it would have to begin with the ungrammatical source (247), which is not allowed by our model of grammatical viruses in relation to the grammar.

(247) * That is the man whom I spoke.

Instead, it would start from grammatical sources like those in (248), producing the virus forms shown.

(248) a. That is the man whom I spoke with. $\longrightarrow$ That is the man with whom I spoke with.

That is the man to whom I spoke with.

b. That is the man whom I met. $\longrightarrow$ That is the man to whom I met.

The virus, as stated in (246), does not specify a preposition to be inserted. Thus, when the grammatical source sentence includes a stranded preposition, as in (248a) the inserted preposition may or may not match the stranded one.

Presumably, if a virus like (246) existed, it would arise in response to prescriptive pressure to use preposition pied-piping. However, it would be an unusual virus, compared to the others we have seen, in that it would produce only overcorrections. We can imagine two possible ways for this situation to arise:

- Certain English speakers have preposition pied-piping in their grammars. They do not employ a grammatical virus like (246). Other English speakers do not have preposition pied-piping in their grammars. In response to prestige input with preposition pied-piping, they formulate a virus rule like (246). These speakers would have no way of licensing regular pied-piping in their grammars, but they could use their virus rule to license sentences like (243)-(245).

- All English speakers have preposition pied-piping and preposition stranding in their grammars. Prescriptive pressure exists to expunge the stranding option in

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favor of the pied-piping option. Speakers, thinking they should be "learning" something new from this prescriptive rule, come up with a virus rule like (246).

In the following section, I present an experiment designed to test for the presence of a grammatical virus rule that creates all three types of extra preposition sentences discussed above.

4.2.2.1. Experiment 3b: Extra prepositions in acceptability judgments
4.2.2.1.1. Goal

The goal of this experiment is to look for evidence for the proposed grammatical virus rule in (246). Note that this rule produces all three types of overcorrections observed by Rudin (1986): repeated prepositions, different prepositions, and sourceless prepositions. Therefore, if such a rule exists for speakers, those speakers should treat the tree types roughly the same in acceptability judgments. This is what will be tested in this experiment.

Note that since the proposed virus produces only overcorrections, we cannot perform the same type of analysis used for Experiments 1 and 2.

4.2.2.1.2. Method

Again, the method, including the subjects and the procedure, are the same as for the other acceptability judgment experiments that have been reported. Each subject provided acceptability judgments for each of the following sentences:

(249) a. I remember with which friends I played with.
       b. I saw with which boy Sam went to the theater with.

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(250) a. Carrie's mom knew to which girl Carrie played with.
      b. I know to which friend Ernie went bowling with.

(251) a. I remember to which friend Ernie picked for the circus.
      b. The costume guy asked Sam to which actor the director picked to be the hero.

(249)-(251) represent all three types of sentences that would be created by a preposition insertion virus: repeated prepositions in (249), mismatched prepositions in (250), and "sourceless" prepositions in (251).

4.2.2.1.3. Results

Sentence Type	Kinder.	Elem.	Middle	High	College
Repeated prepositions Ex. I remember with which friends I played with.	46%	23%	20%	10%	17%
Two different prepositions. Ex. Carrie's mom knew to which girl Carrie played with.	54%	27%	7%	7%	3%
Sourceless preposition Ex. I remember to which friend Ernie picked for the circus.	64%	54%	13%	20%	7%

Table 22   Percentage of tokens accepted in preposition experiment

4.2.2.2. Discussion

The results do not support the existence of a preposition insertion virus for the majority of speakers. Almost all of the college students subjects consistently rejected the forms that such a virus would produce. In addition, acceptance of those forms never exceeded 20% for middle school or high school subjects. Recall that when we looked at *whom* and nominative pronouns in conjoined noun phrases, subjects in middle school and high school were the most likely to accept

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virus forms, presumably because of the intense prescriptive input to which they are exposed in school.

For the middle school, high school, and college students, the mismatched preposition sentences were accepted at a lower rate than the other two types of potential virus forms, providing further evidence against a virus that licenses all three types of sentences. Instead, I would like to propose that any production or acceptance of such sentences is due to processing errors. Suppose a person hears or produces a pied-piped preposition. By the end of the sentence, that first preposition may no longer be in the person's working memory, causing him or her to accept or produce a second (usually, but not always, identical) preposition in the stranding position. (See Dickey (1996) for a similar proposal concerning resumptive pronouns.) The fact that acceptance of the extra preposition sentences increased with age would then mirror the young children's greater susceptibility to processing errors.

Preliminary support for this processing analysis comes from Bergh (1998), who looks at the phenomenon of double prepositions (including both repeated and different prepositios) in the Helsinki Corpus in Old, Middle, and Early Modern English. He finds the first examples of repeated prepositions in the early Middle English period. They become more common in the late Middle English and at the beginning of the Early Modern English period, after which, their use disappears from the Helsinki corpus. Two of the examples cited by Bergh are given in (252) and (253).

(252) þe muche wlite habbe; nim him *of* hwas beoð awundret *of*; þe sunne & te mone. up-o hwas nebscheft;

(Bergh 1998: 7, quoting Hali Meidhad c. 1200)

(253) an occurrence *for* which they have been... in patient expectation *of*

(Bergh 1998: 11, quoting Goldsmith, 18th c.)

As Bergh notes, the periods of most frequent use of repeated prepositions coincides with the transition from obligatory to optional preposition pied-piping with *wh*-elements in English. Thus, during the time period when speakers were likely to use either pied-piping or stranding, they were also most likely to repeat prepositions, possibly due to an inability to hold in memory the fact that the pied-piping option had already been chosen.[43] Both the increase and disappearance of repeated prepositions in the Helsinki corpus pre-dates the rise of prescriptive grammar in the 1700s, casting further doubt on the idea that a grammatical virus should account for such forms. Though only speculative at this point, a processing account of repeated prepositions could be tested by collecting acceptability judgments of sentences of varying length between the two instances of a repeated preposition. If the type of processing effect outlined above were real, we would expect subjects to accept repeated prepositions more when more material intervened between the two instances. If the proposal turns out to be correct, we will have to conclude that the case reported by Rudin (1986), in which a student insisted on the correctness of a sentence with a repeated preposition, is an exceptional one.

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[43] Of course, Middle English examples are only in written form. We might expect the type of processing error I am describing to be more evident in speech than in writing. However, its occasional occurrence in writing is not implausible.

In summary, it is not likely that repeated prepositions or other examples with extra prepositions are caused by a grammatical virus. In acceptability judgments, where subjects pay close attention to form, adults almost always reject this type of example. Repeated prepositions appear to be caused by a processing error, whereby speakers and hearers lose track of the fact that a preposition has already been produced in the pied-piping position, and produce it again in the stranding position. This type of error occurred in the Middle English period, before the development of prescriptive grammar rules that could have resulted in a grammatical virus.

4.3. Subjunctive were in if clauses

4.3.1. The phenomenon

The last potential grammatical virus to be examined here is one that, to the best of my knowledge, has not received prior attention from linguists. This is the use of the subjunctive form *were* in sentences like (254).

(254) I asked if she were single.

In Modern English, the subjunctive form of a verb, when allowed, is usually optional. So, alongside the subjunctive forms in (255a), (256a), and (257a), we have the indicative forms in (255b), (256b), and (257b).

(255) a. I demand that you be on time.
b. I demand that you are on time.

(256) a. I wish Sara were here.
b. I wish Sara was here.

(257) a. If I were rich, I could buy a Corvette.
b. If I was rich, I could buy a Corvette.

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Presumably, this optionality is the reason that the subjunctive receives the attention that it does in prescriptive grammar books (eg. Johnson 1982; Einsohn 2000[44]). These sources prescribe use of the subjunctive in clauses expressing unrealized, counterfactual or hypothetical propositions, as in (255)-(257). However, prescriptive grammarians have noticed a certain hypercorrection: Some English speakers and writers seem to use the form *were* any time it comes in a clause introduced by *if*, even if that clause does not express a counterfactual or hypothetical proposition. For example, Einsohn (2000) writes, "Much of the confusion concerning [...] use of the subjunctive results from the mistaken assumption that most clauses introduced by *if* are contrary to fact and therefore might benefit from a subjunctive. This is not at all the case. For example, when an *if* clause introduces a condition that has not yet come to pass, an indicative verb is mandatory [...] An *if* clause may also express a condition whose truth or falsity is unknown, and in this case too, the indicative is called for." Johnson (1982) notes the following uses of *were*, which he considers errors. In (258), *if* introduces "a condition that has not yet come to pass," and in (259)-(260), *if* introduces conditions "whose truth or falsity is unknown."

(258) She knew that if she were to graduate she would have to study harder.

(259) If he were rich you couldn't tell it by his clothes.

(260) He asked me if I were rich.

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[44] Einsohn (2000) is a copyeditors' handbook containing, among other things, prescriptive recommendations.

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For each of these examples, Johnson prescribe the indicative form *was*. Spanish, a language with a robustly used subjunctive, also uses the indicative in these examples (Lara Reglero, p.c.).

(261) Sabia   que si se iba   a graduar tendria   que estudiar
     She-knew that if CL was-ind . to graduate she-would-have that study
(mucho) mas.[45]
much more

'She knew that if she was to graduate she would have to study (much) more.'

(262) Si era   rico no lo   pudiste adivinar por su ropa.
     If he-was-ind. rich neg CL couldn't guess   by his clothes
     'If he was rich, you couldn't guess it from his clothes.'

(263) Me pregunto si   era   rico.
     CL asked   if I-was-ind. rich
     'He asked me if I was rich.'

Given the optionality of the subjunctive and what prescriptive grammarians consider the overuse of the subjunctive following *if* in English, James (1986) goes so far as to suggest that Modern American English does not have a past subjunctive form at all, and that "*were* is merely an alternate of [indicative] *was* which is restricted to particular environments" (108). These environments include positions following *if*. James cites the following contrast, in which *were* can follow *as if*, but not *like*:

(264) a. He's behaving as if he was sick.
     b. He's behaving as if he were sick.
     c. He's behaving like he was sick.
     d. * He's behaving like he were sick.

Thus, *were* behaves very much as though it were conditioned by a grammatical virus that includes the word *if* in its context. In the following

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sections, I explore this possibility by looking for evidence in spontaneous production of *were* and in acceptability judgments.

4.3.2. Spontaneous Speech Study 5: *if...were* in child and adult speech

4.3.2.1. Method

Once again, the ten CHILDES corpora were searched using the program *combo*. This time, all utterances containing *if* and *was* or *were* were extracted. These were then searched by hand to find only those utterances in which *if* and *was/were* were in the same clause, and in which that clause had a first or third person singular subject (since *was* can never be used with second person or plural subjects). Utterances were not coded for whether or not prescriptive grammar requires the subjunctive in the *if* clause. This is because, in too many cases, that would require more information than is available about the utterance context and the facts about the situation under discussion. Instead, some specific cases are discussed in which enough context is available to make that determination.

4.3.2.2. Results and discussion

The number of uses of *if...were* and *if...was* with singular first person or third person subjects is given in Table 23.

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[45] In fact, the choice between subjunctive and indicative is reported to depend on the context in this example. In the absence of context, my consultant prefers the indicative.

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Corpus	Adult Subjun.	Adult Indic.	Adult Total	Child Subjun.	Child Indic.	Child Total
Adam	3	2	5	0	0	0
Allison	0	0	0	0	0	0
April	0	0	0	0	0	0
Eve	0	0	0	0	0	0
Naomi	0	0	0	0	0	0
Nathaniel	1	2	3	0	0	0
Nina	0	1	1	0	0	0
Peter	1	2	3	0	0	0
Sarah	3	6	9	0	3	3
Shem	1	3	4	0	0	0
Total	9	16	25	0	3	3

Table 23   Uses of *if...were* and *if...was* in CHILDES corpora

These constructions were used very infrequently. In fact, there were no uses at all in four of the ten corpora. No child used the subjunctive after *if,* and only one child, Sarah, used the indicative. Of her three uses, which are given below, it is not clear for any of them whether they prescriptively require the subjunctive.

(265) CHI: <if you> [///] I [///] you [///] if I was gonna be afraid of everybody # hide
       under here.   Sarah 116, line 767

(266) CHI: so # if there was somebody other one but not # the birdies or
       nothing(g).   Sarah 130, line 220

(267) CHI: oh # if it was like that?   Sarah 134, line 743

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Among the adults, there were uses of both the subjunctive and the indicative following *if*. There were no clear cases of adults using the subjunctive when prescriptive grammar would not allow it. Most uses of the subjunctive were in counterfactual clauses, as in (268).

(268) MOT: if it were real # but this is a plastic flower.　　Adam 34, line 679

On the other hand, the indicative was used both when prescriptive grammar calls for the subjunctive, as in (269), and when it does not, as in (270).

(269) ANN: I wouldn't pick him up if I was you # Sarah.　　Sarah 97, line 473

(270) LOI: yeah # I was just feeling to see if it was sharp.　　Peter 11, line 1066

Since almost all children failed to use either *if...was* or *if...were* constructions, nothing can be concluded from the children's data. Adults' behavior confirms that use of subjunctive *were* after *if* is optional in English; adults used both *was* and *were* in subjunctive contexts following *if*. Although we do not find any examples of overextension in adults' use of *were,* we were in the same situation with respect to use of *whom* and nominative pronouns in conjoined noun phrases; in the spontaneous speech studies of these phenomena, we did not find examples of overextension in adult speech.

Two examples from the adult data are of particular interest, and are given below:

(271) MEL: if Donna were here and was talking # then we could play it back afterward and you could hear it.　　　　　　　(Sarah 122, line 891)

(272) INV: but if the wind is [//] if that &a the flag were right here and the wind was coming from over here # it would go prr # see?　(Shem 40, line 1003)

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In each of these examples, *if* introduces conjoined clauses, and the speaker uses *were* in the first clause and *was* in the second. It seems that these speakers use *were* in these sentences based on the linear closeness of the verb to the word *if*, a condition that is highly suggestive of a virus context.

In the following section, I report the results of an acceptability study designed to test the proposal that a grammatical virus conditions the use of *were* after *if* in English.

4.3.3. Experiment 4: *if...were* in acceptability judgments

4.3.3.1. Goal

The primary goal of the experiment was to look for further evidence of a grammatical virus conditioning use of *were* when it follows *if*. Specifically, I wanted to see whether subjects were more likely to accept *were* after *if* than after *whether* in sentences like (273a-b), below.

(273) a. I asked if Mike were rich.
      b. I asked whether Mike were rich.

If so, this could be evidence that the use of the specific lexical item *if* conditions use of *were* through a grammatical virus.

William Snyder (p.c.) has pointed out to me that even if subjects are more likely to accept *were* after *if* than after *whether,* it could be due to a semantic difference between *if* and *whether,* not a grammatical virus. If *if* is more likely to be used in connection with a dubious proposition, while *whether* is used for a proposition equally likely to be true or false, it could be that the subjunctive is actually more appropriate in *if* clauses than in *whether* clauses. In the situations

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set up in the experiment, the truth or falsity of each proposition was, at some point, completely unknown. In most cases, the proposition turned out to be true. For example, in one story, Ernie's father asks Ernie's friend Joe if he is hungry. At that point, there is no reason to suspect either that Joe is or is not hungry. When Joe answers, it turns out that he is. Then, after the story is over, subjects had to give an acceptability judgment for the sentence (274).

(274) Ernie's dad asked Joe if he were hungry.

Keeping in mind the caveat about possible semantic differences between *if* and *were,* I present the experiment.

4.3.3.2. Method

The method was identical to that described for experiments 1-3, with the same subjects participating in an acceptability judgment task. The sentences judged are given in (275)-(284).

(275) a. Carrie's mom wished Emily was there.
b. When David got to the party, he wished Marcy was there.

(276) a. Bart wished Milhouse were there.
b. The teacher wished that Gary were more like Lucy.

(277) a. If Joe was a superhero, he would be invisible.
b. If I was a wizard, I would do magic all the time.

(278) a. If Ernie were brave, he would carry a bird.
b. If Jake were a superhero, he would fly.

(279) a. Chris asked Sally's mother if Sally was nice.
b. The teacher asked Gary if he was sorry.

(280) a. Bert's dad asked Joe if he were hungry.
b. Jake asked Joe if he were going trick-or-treating.

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(281) a. Lisa asked whether the kitten was lost.
b. Then he asked Sam whether he was happy.

(282) a. Bonnie wondered whether Sally were nice.
b. I asked whether Jack were a wizard.

(283) a. The man asked if, in the spring, Big Bird was planning to build a new nest.
b. Miss Piggy wondered if, really, the frog was a prince.

(284) a. David asked if, after the game, Marcy were going to the party.
b. I asked if, tomorrow, Miss Piggy were going to kiss the frog again.

The sentences in (275)-(276) include *was* and *were* in the sentential complement of the verb *wish*, and those in (277)-(278) use *was* and *were* in conditional clauses. Both of these are contexts where prescriptive grammar requires the subjunctive, and the purpose of including them was to establish whether the subjects in the study allow either *was* or *were* to appear in these contexts. In (279)-(280), *was* and *were* appear in the sentential complements of *ask*, introduced by *if*. Since the truth or falsity of the proposition expressed by the complement is unknown, use of the subjunctive is not prescribed in these sentences. The same is true for the sentences in (281)-(282), in which *ask* or *wonder* takes a sentential complement introduced by *whether* and containing *was* or *were*. Finally, in (282)-(283), we once again have *ask* or *wonder* with sentential complements introduced by *if* and containing *was* or *were*. This time, an adverbial phrase intervenes between *if* and the subject of the embedded sentence. The purpose of testing these sentences was to see if lengthening the linear distance between *if* and *were* would decrease the acceptability of *were*. Note that this is only a test of one specific way in which an "*if...were*" virus could be formulated.

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4.3.3.3. Results

Table 24 gives the percentage of tokens of each sentence type accepted.

Sentence Type	Kinder	Elem.	Middle	High	College
Complement of *wish*; *was* Ex. Carrie's mom wished Emily was there.	96%	96%	97%	100%	87%
Complement of *wish*; *were* Ex. Bart wished Milhouse were there.	68%	88%	77%	83%	83%
Conditional; *was* Ex. If Joe was a superhero, he would be invisible	86%	85%	100%	87%	77%
Conditional; *were* Ex. If Ernie were brave, he would carry a bird.	86%	85%	100%	100%	97%
Embedded question; *if...was* Ex. Chris asked Sally's mother if Sally was nice.	96%	100%	100%	100%	97%
Embedded question; *if...were* Ex. Bert's dad asked Joe if he were hungry.	82%	62%	57%	47%	50%
Embedded question; *whether...was* Ex. Lisa asked whether the kitten was lost.	82%	77%	93%	90%	100%
Embedded question; *whether...were* Ex. Bonnie wondered whether Sally were nice.	68%	65%	43%	23%	30%
Embedded question; *if...adv...was* Ex. The man asked if, in the spring, Big Bird was planning to build a new nest.	82%	85%	53%	70%	67%
Embedded question; *if...adv...were* Ex. David asked if, after the game, Marcy were going to the party.	82%	58%	43%	30%	47%

Table 24   Percentage of tokens of *was* and *were* accepted

Subjects at all ages accepted both *was* and *were* at a high rate in the sentential complement of *wish* and in conditionals, but overall, they preferred *was* in the complement of *wish* and *were* in conditionals.

In embedded questions introduced by *if*, subjects of all ages accepted *was* at a very high rate. Acceptance of *were* was lower, with the biggest difference

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obtaining for the high school students. When the embedded questions were introduced by *whether,* acceptance of *was* was depressed for the youngest two age groups, relative to the *if* sentences. For the oldest three age groups, acceptance remained quite high. In embedded questions introduced by *whether,* acceptance of *were* was depressed for all age groups.

Finally, consider the embedded questions with adverbial phrases intervening between *if* and *was* or *if* and *were.* The presence of an adverbial phrase decreased acceptance for all age groups; however, this effect does not appear to be greater for sentence with *was* than for sentences with *were.*

For the statistical analysis, I focused on three of the sentence types, which were classified as either Correct, Viral, or Other, the same classifications used in the statistical analyses in Experiments 1 and 2. In the Correct sentences, those in (278), the prescriptive rule requires, and the proposed virus rule allows, use of the the subjunctive form *were.* In the Viral sentences in (280), the proposed virus rule allows use of subjunctive *were,* though it is prescriptively incorrect. Neither the virus rule nor the prescriptive rule allows *were in* the Other sentences in (282).

I will use the statistical analysis to test the following two hypotheses: (i) The rate of acceptance of *were* differs in virus contexts and non-virus contexts. (ii) There is an effect of age group.

A two way repeated measures ANOVA was performed with the two factors Sentence Type (Correct, Viral, Other) and Age Group (Kindergarten, Elementary, Middle, High, College). The ANOVA found a significant main effect of Sentence Type ($F[2, 134] = 45.7, p < .001$). The main effect of Age Group was

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not found to be significant ($F[4, 67] = 2.4$, $p = .055$), but there was a significant interaction effect between Age Group and Sentence Type ($F[8, 134] = 3.2$, $p = .002$), confirming hypothesis (ii). These results were further investigated through pairwise comparisons performed by Tukey Test.

The Tukey Test found a significant difference between levels of acceptance of Correct sentences and Other sentences ($p < .001$) and between levels of acceptance of Viral sentences and Other sentences ($p = .024$), confirming hypothesis (i). There was also a significant differce between the acceptance of Correct sentences and Viral sentences ($p < .001$). This result is discussed in the follwing section.

Concerning the interaction between Age Group and Sentence Type, the Tukey Test found that subjects in the College, High, and Middle groups distinguished between Correct and Other sentences ($p < .001$ for all). This distinction was not found to be significant for subjects in the Elementary and Kindergarten groups. The test did not detect a significant difference between Viral and Other sentences for any individual subject group.

4.3.3.4. Discussion

In the sentential complement of *wish,* subjects accepted both *was* and *were* at a high rate, although all subject groups accepted more instances of *was* than *were.* This is a context where prescriptive grammar requires use of the subjunctive. Assuming that there is no grammatical virus applying to these sentences, this tells us that, for many speakers, subjunctive *were* is an option in

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their grammars. They can either use it or not. The statistical analysis found that there was a significant difference between acceptance of Correct sentences and Viral sentences, though *if* is in virus contexts in both types. This could be due to an option in the grammar to use the subjunctive in the Correct sentences, but not in the Viral sentences.

If subjunctive *were* is available in the grammar, why would there also be a grammatical virus producing it? Precisely because subjunctive *were* alternates with *was* in speakers' language use, the use of subjunctive *were* has received a great deal of attention in prescriptive grammar. This prescriptive focus on the use of *were* could result in a grammatical virus, and in fact, the acceptability judgment data contains some evidence that that is the case. In conditional clauses, which are introduced by *if,* subjects accepted *were* as much as or more than they accepted *was.* The preference for *were* in a conditional clause is greatest for the high school and college subjects. This contrasts with subjects' judgments of *was* and *were* in the complement of *wish,* which does not contain *if,* and lends support to the idea that, in addition to being licensed by the grammar, *were* can be licensed by a grammatical virus in the presence of *if.*

Now, consider the judgments of sentences that contain embedded questions. There were four possible combinations of complementizer and embedded verb: *if...was, if...were, whether...was,* and *whether...were.* Overall, all subject groups preferred the embedded questions introduced by *if* to those introduced by *whether.* However, for the middle school, high school and college subjects, this preference was much more pronounced with the embedded verb

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were than with the embedded verb *was*. In other words, for the older subject groups, the combination *whether...were* is more detrimental to the acceptability of a sentence than the combination *whether...was*. We now have further evidence that the lexical item *if* conditions the use of *were*. For the kindergarten and elementary school subjects, the difference between using *if...were* and *whether...were* was no greater than the difference between using *if...was* and *whether...was*. That is, unlike for the older age groups, the depressed acceptability of *whether...were* for these subjects can be attributed to the use of *whether* alone. This is reminiscent of the situation for *whom* and nominative pronouns in conjoined noun phrases, where young children appeared to have not yet defined the type of virus context relied upon by older speakers. The children in this experiment may be basing their judgments on a virus rule that has the effect of making *was* and *were* interchangeable. Future research should be able to test this idea by collecting children's judgments on *was* and *were* in other contexts. For example, it would be interesting to know how they would respond to the sentence * *The boy were in the house.*

As noted above, the presence of an adverbial phrase between *if* and *was* or between *if* and *were* depressed acceptance for all age groups. (Although the adverbial phrase had no effect on kindergarteners' acceptance of *if...were* sentences, it did affect their acceptance of *if...was* sentences, producing an overall effect.) Had this effect been greater for *if...were* sentences than for *if...was* sentences, we could have concluded that the presence of the adverbial phrase destroys the environment for application of the virus licensing *were*. However, the

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presence of the adverbial phrase did not affect *if...were* sentences more than it affected *if...was* sentences. In the following section, I will consider further how an *if...were* virus could be formulated, including its context.

4.3.4. The *if...were* virus

As we have seen, use and acceptance of *were* displays many of the properties of a grammatical virus. The acceptability of *were* is lexically sensitive; for high school and college subjects, *were* is preferred to *was* in conditional clauses, which are introduced by *if,* despite the opposite preference in the complement of *wish.* Use of *were* after *if* also overextends with respect to the contexts in which it is prescribed, with some subjects accepting *were* in embedded questions. This acceptance is also lexically sensitive; middle school though adult subjects were more likely to accept *were* in an embedded question introduced by *if* than in an embedded question introduced by *whether.*

We have seen evidence that the linear string of words in a sentence is relevant to the context for use of *were* after *if.* In examples (271) and (272), repeated below, *if* introduces one clause with conjoined verb phrases (271) or conjoined clauses (272). In both cases, the first verb is *were* and the second is *was.* It appears that the second verb is too far away from *if* to be affected by the grammatical virus.

(271) MEL: if Donna were here and was talking # then we could play it back
afterward and you could hear it.   (Sarah 122, line 891)

(272) INV: but if the wind is [//] if that &a the flag were right here and the wind
was coming from over here # it would go prr # see?   (Shem 40, line 1003)

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On the other hand, the results from Experiment 4 show that an adverbial phrase between *if* and *were* does not destroy the virus context.

I propose the following virus rule for the use of *were* following *if:*

(285) The "if...were" Rule
        If: *if...was*, where
            1   2
        2 is the first verb following 1
        Then: *was* → *were*

Further investigation may reveal the need to refine this rule, but for the data available to us, it is sufficient. In (271) and (272), the rule affects only the first verb after *if,* and it ignores intervening adverbial phrases, as long as they do not contain verbs.

4.4. Conclusion to Chapter 4

Identifying a grammatical virus is not an exact science. Rather it is piece of detective work that involves:

- finding a phenomenon in a language that conforms neither to the prescriptive standard nor to the pattern found in other languages[46],

- looking for evidence of sensitivity to linear order and lack of sensitivity to hierarchical structure, and

- stating an appropriate virus rule.

The most difficult of these steps is the second, since there is always the chance of discovering previously unnoticed sensitivity to hierarchical structure. This is what happened with regards to plural agreement in expletive constructions. Until one

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[46] Generally, prescriptive rules are modeled on current or historical natural languages.

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recognizes the two types of expletive constructions, it is not clear that agreement in ECs is sensitive to hierarchical structure.

Collecting experimental data from speakers of different age groups can also be helpful in identifying grammatical viruses. As discussed in Chapter 2, young children (until sometime in elementary school) tend to accept grammatical virus forms in a wider range of contexts than older speakers do. That appeared to be the case with use of *were* following *if*. But, this type of evidence alone is not enough to determine the presence of a grammatical virus. For example, in the preposition placement experiment (Experiment 3), young children accepted sentences with "extra" prepositions more than adults did. However, I rejected the idea of a grammatical virus for preposition pied-piping based on other types of evidence and suggested that processing considerations could have contributed to children's behavior in the experiment.

Thus, it truly is important to combine both empirical and theoretical evidence in determining whether a given linguistic phenomenon is virus-produced.

Chapter 5. Conclusion

5.1. Summary of the dissertation

Prestige language, thought of by many to be of interest only to sociolinguists, is an important topic for formal linguists to be familiar with because of the effect it can have on speakers' linguistic intuitions and language use. Basing theories of the innate language faculty on observed linguistic data—including linguistic intuitions and language use—is valid only insofar as these sources reflect the innate language faculty and not other factors. In this dissertation, I have used experimental and theoretical tools to discover more about how aspects of prescriptive grammar can "taint" linguistic data, as language users are affected by grammatical viruses, extra-linguistic rules created in response to prestige language input.

In Chapter 1, we saw that grammatical viruses cause overcorrections (eg. *Give the book to John and I*) that have been recognized by prescriptive and descriptive linguists alike. Sobin (1997) and Lasnik and Sobin (2000) made substantial contributions to the theory of grammatical viruses, making proposals for a set of properties that characterize them and for formal statements of grammatical virus rules. However, much work remained (and still remains) to be done.

In Chapter 2, I presented the results of spontaneous speech studies and acceptability judgment studies of two phenomena independently argued to be affected by grammatical viruses in English: use of *whom* and use of nominative

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pronouns in conjoined noun phrases. In spontaneous speech, adults employed grammatical viruses with far less frequency than they used their non-viral counterparts (i.e., *who* and accusative pronouns). Children used grammatical viruses even less; in fact, no child ever used *whom* except in a repetition of an adult utterance. Some children did use *I* in conjoined noun phrases. Although this was rare, it shows that children are sensitive to the limited amount of input they get that is affected by grammatical viruses.

The effect of grammatical viruses on children was confirmed in the acceptability judgment studies. Many young children accepted sentences involving grammatical viruses. Children, in fact, accepted the use of *whom* and nominative pronouns in conjoined noun phrases in a wider range of contexts than adults did. I argued that this is an indication that children form very general virus rules, which are later revised to apply in more restrictive contexts, based on direct and indirect negative evidence. From the judgments of the older children and the adults in my study, we saw that grammatical viruses may be accompanied by varying degrees of conscious awareness of the prescriptive rule involved. For example, adults often rejected accusative pronouns in conjoined noun phrases (eg. *Give the book to John and me*), presumably in deference to what they perceive to be the prescriptively correct nominative, but they did not similarly reject use of *who* in deference to *whom*.

In Chapter 3, I explored the correct way to state grammatical virus rules. Since grammatical viruses are not part of the natural mental grammar (Universal Grammar), which is believed by some to be an informationally encapsulated

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module, I aimed to state grammatical virus rules with as little reference to or interaction with the grammar as possible. It turned out to be possible to state *whom* and nominative pronoun virus rules so that they made no reference to the grammar, only to speakers' categorization of lexical items into classes like "noun," "verb," etc. It was argued that grammatical viruses operate on the linear strings of words that constitute the output of the grammar, after all syntactic operations have applied. As a result, grammatical virus phenomena tend to have certain properties such as sensitivity to linear order, insensitivity to hierarchical organization, and lexical specificity.

The goal of Chapter 4 was to use the results of Chapters 2 and 3 in determining whether or not English speakers' use and judgments of three other constructions had been affected by grammatical viruses. Plural agreement in expletive constructions was argued not to be the result of a grammatical virus: Spontaneous speech data showed that plural agreement is used in a wider range of contexts than could be captured by a grammatical virus, and theoretical investigation showed that use of plural agreement is sensitive to hierarchical structure. I also argued against a virus analysis of preposition pied-piping in English: Acceptability judgments failed to provided evidence for any overcorrection, typical of grammatical viruses, and statement of a virus rule within the bounds set in Chapter 3 proved problematic. The phenomena of preposition doubling and other types of extra prepositions also did not fit the criteria for being virus produced. They are not lexically specific, they are rarely accepted by any age group in acceptability judgments, and different types of

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sentences did not pattern together in the judgment data, although they were predicted to by the suggested virus rule. I did find evidence supporting the existence of a grammatical virus that mimics the subjunctive mood, licensing the use of *were* after *if*. It is possible to formulate an appropriate virus rule within the limits established in Chapter 3. In acceptability judgments, children were less selective than adults in the range of contexts in which they accepted *were*. This is similar to the situation found for *whom* and nominative pronouns. In addition, some utterances found in the spontaneous speech study showed *were* being used in close linear proximity to *if*, although *was* was used later in the sentence.

5.2. Directions for future research

In this dissertation, I have looked only at grammatical viruses in English. One should be able to identify grammatical viruses in other languages, particularly those with strong prescriptive traditions. Future research in other languages may be able to shed further light on the formation, use, and form of grammatical virus rules. I have proposed that grammatical viruses can do nothing but change the forms of particular words. If this is correct, we expect to see grammatical viruses affecting word forms (and not, for example, word order) in other languages as well. Verification of this expectation for languages other than English would give greater credence to the theory of grammatical viruses.

Another area for feature research is how grammatical viruses affect speakers of non-standard dialects of English. Consider, for example, a speaker of African American English (AAE) with limited early exposure to Standard

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American English (SAE). Upon reaching school age, this person is likely to be faced with intense prescriptive input and pressure toward SAE, which could result in a unique set of grammatical viruses. Understanding these effects would be relevant both for study of AAE, and for developing educational methods for the teaching of SAE.

This brings us to a third avenue for future research. Grammatical viruses deserve attention not only from linguists, but from educators. In a society in which mastering the standard is important for survival in many workplaces, it is highly relevant when the teaching of grammar systematically misses the mark. Quattlebaum (1994) and Sobin (1994b) are among the authors who have discussed how prescriptive teaching results in overcorrection and possible ways to improve instruction. But as understanding of grammatical viruses expands, educators may be able to make even further advances in teaching methods that will help students master the rules necessary for success.

Finally, there are several areas for future research that were brought up throughout the dissertation:

- How do subjects respond in acceptability judgments of virus forms when their judgments are speeded? This could allow us to remove the effect of conscious ideas about language forms, since subjects would not have time to ponder the test items.

- How would subjects explain their rejections of sentences with *me* in conjoined Noun Phrases? Would they, as I suggested, make reference to the prescriptive rule for *I*?

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- Do adults of the same age, but with different levels of education, use and judge virus forms differently? In the studies reported here the age of subjects was correlated with their educational level. Studying adults with different educational levels could help us in separating the effects of virus input in casual speech and virus input in formal educational settings.

5.3. Implications

I hope this dissertation has succeeded in making clear the necessity of being able to identify grammatical viruses and also advancing understanding of how that can be done. In addition, the work presented underscores the nature of the Language Acquisition Device. In showing that there are fundamental differences between grammar rules and grammatical virus rules, the work highlights the fact that the Language Acquisition Device can not learn any rule thrown its way. When faced with input that is unlearnable by the LAD, one of three things can happen: (i) a different rule, one that conforms to UG, is learned, as in the creation of creoles from pidgins, (ii) the input is ignored, or (iii) the rule is incorporated into the speaker's knowledge by another means, for example, by a grammatical virus rule.

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Appendix

Stories used to in setting up utterances for the acceptability judgment tasks.

(Items for Experiments 1-4 were co-mingled.)

Harold and his friends, Bert and Ernie, were going for a walk when they found two baby birds that had fallen out of their nests. They thought the birds looked hungry, and they wanted to take the birds home and give them some food. Bert suggested that he could carry one bird, and Ernie could carry the other one. But Ernie took Harold aside and said "I have to tell you a secret. Nobody else knows, but I'm afraid of baby birds. I would love to be brave like you. Then I would carry a bird. Will you carry this bird for me?" So Harold carried one bird, and Bert carried the other one.
- I remember with which friends I played with.
- We found birds who we thought were hungry.
- Bert said that Ernie and he could carry the birds.
- But then, there was a secret, just between Ernie and me.
- If Ernie were brave, he would carry a bird.
- The baby birds were carried by Bert and I.

Carrie was outside playing with her friend Emily all afternoon. Then, when it was almost time to go home, another friend, Martha, came by. Carrie didn't know if she should walk home with Emily or Martha. She had to pick one, and she wondered which she should pick. Since Martha lived closer to Carrie, they walked home together. When they got to Carrie's house Carrie's mom said, "I wish your friend Emily had walked home with you. I wanted to meet her. I know that you always play together, but I've never met her."
- I know with which girl Carrie played.
- Carrie wondered whom she should pick.
- I know who Carrie walked with.
- Carrie's mom wished Emily was there.
- Carrie's mom knew to which girl Carrie played with.

Four friends, Kermit, Cookie Monster, Smurfette, and Sleepy Smurf, were at the beach. Kermit decided to build a sandcastle. Smurfette and Sleepy Smurf went swimming in the ocean. Cookie Monster was hungry and bought a big cookie shaped like a boat. Then, Smurfette and Sleepy Smurf came running out of the water and Smurfette said, "Look! We found a big seashell!"
- I know who built a sandcastle.
- I also know whom went swimming.
- I know which one Smurfette went swimming with.
  Smurfette went swimming with Sleepy Smurf.

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- I forgot who bought a cookie.
- Smurfette said that Sleepy Smurf and her found a big seashell.

Sam and his friend, Tim, went to the theatre because they were going to be in a play. When they got there, the director told Sam that he'd been chosen to play the hero. Then Sam went to see the costume guy. The costume guy asked Sam, "Who did the director pick to be the hero? That person gets to wear this cape." Sam was very excited because the director had chosen him, and he put on the cape. "How handsome you look," said the costume guy. "Are you happy?" "Yes I am," said Sam. That night, Sam celebrated by having ice cream with Tim.
- I saw with which boy Sam went to the theatre with.
Why did Sam go to the theatre?
- Him and Tim were in a play.
- The costume manager asked Sam to which actor the director picked to be the hero.
- Then he asked Sam whether he was happy.
How did Sam celebrate?
- He and Tim ate ice cream.

Bonnie and Chris decided to build a fort. So Bonnie asked her mother if she had any wood. Once the kids got the wood, they built a great fort. When they were done all the kids in the neighborhood wanted to play inside the fort. But Bonnie and Chris decided only to invite very nice kids. The ones who were not so nice were not invited. One day, a new kid named Sally moved in. "Is she nice enough to come to the fort?" Bonnie wondered. Then Chris had an idea. He asked Sally's mother, "Is Sally nice?" Sally's mother said 'yes,' so Bonnie and Chris invited her to play in the fort.

Why did Bonnie ask her mother for wood?
- She and Chris wanted to build a fort.
- They invited kids whom they thought were nice.
- Bonnie wondered whether Sally were nice.
- Chris asked Sally's mom if Sally was nice.

Two brothers, Jake and Joe are talking:
Jake: Wouldn't it be cool to be a superhero? I would use my magical powers to fly through the air.
Joe: I would be invisible!
Jake: Are you going trick-or-treating this year?
Joe: Of course!
Jake: Good! I'm going to tell Mom that we want to be superheros for Halloween.

- If Jake were a superhero, he would fly.
- If Joe was a superhero, he would be invisible.

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- Jake asked Joe if he were going trick-or-treating.

And what is Jake going to tell their mother?
- Jake will tell his mom that him and Joe want to be superheroes for Halloween.

Gary's class took a field trip to the zoo. The teacher announced, "At the end of the day, I will buy ice cream for the best-behaved student." While the rest of the kids were looking at the elephants, Gary and his friend, Jill, wandered off to look at the monkeys. When the teacher realized that Gary and Jill were not with the rest of the group, she became very upset, and she told them that they would not be chosen to get ice cream. Then she said to Gary, "I wish you would act more like Lucy. She is always very well-behaved." At the end of the day, Lucy was chosen to get ice cream. Gary looked very sad, so the teacher asked him, "Are you sorry for wandering off?" He said he was, so the teacher said that he could have a small piece of candy.

Why didn't Gary get ice cream?
- Jill and him wandered away from the group.
- The teacher wished that Gary were more like Lucy.
- The teacher picked the student whom she thought was well-behaved.
- The teacher asked Gary if he was sorry.

One day, Bart and Lisa were walking home from school eating grapes. On the side of the road, they saw a little kitten meowing and looking very sad. "Oh no!" said Lisa. "Is he lost?" Bart said, "I think so. I wonder what we should do. I wish our friend Milhouse had walked home with us. He would know what to do because he has a cat at home." Lisa said, "Maybe he's hungry." Bart said, "I think you're right." So Bart and Lisa fed the kitten some of their grapes. But then Lisa said that they better hurry up and get home because they were late and their mother would worry about them.
- Lisa asked whether the kitten was lost.
- Bart wished Milhouse were there.
- Bart and Lisa fed a kitten who they thought was hungry.
- Lisa said that Bart and she were late.

Dodo and Jack were walking through the park one night, when they saw a very strange creature huddled up. Suddenly, the creature moved, and they saw that it was a huge monster. The monster walked toward them, opening its mouth hungrily. Then, Jack pulled out a wand and said a spell, and the monster fell down, and couldn't move. "How did you do that?" Dodo asked. "Are you a wizard?" Jack nodded. "How did you learn that spell?" asked Dodo. "Did your dad teach you? Your mom? Who?" Jack answered, "I'll tell you, but you can't tell anybody else. It's a secret." So Jack whispered in to Dodo's ear, and told him how he learned the magic spell. "I would love to be a wizard!" exclaimed Dodo. "I would cast magic spells all the time." But Jack said, "You have to be careful with magic. It can be very dangerous."

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- I asked whether Jack were a wizard.
- I asked whom taught Jack the spell.
- There is a secret between me and Jack.
- If I was a wizard, I would do magic all the time.

David was watching a school baseball game and planning to go to a party afterward. He saw Marcy, a girl from his class, watching the baseball game. "Are you going to the party later?" he asked her. "Yes, I am. I'll see you there," Marcy answered. When David got to the party, he didn't see Marcy, and he thought, "I hope Marcy comes." Then she did show up, and they talked for hours. Later, when David got home, his mother asked which friends he saw at the party. David didn't mention Marcy because he was embarrassed that he was hanging out with a girl.
- David asked if, after the game, Marcy were going to the party.
- When David got to the party, he wished Marcy was there.
- David's mom asked who he saw at the baseball game.

One day, Dodo and his friend Big Bird were taking a walk when a man carrying a pile of twigs came up to Big Bird. "Excuse me," said the man. "Are you planning to build a new nest in the spring? I have some wonderful twigs to sell." Big Bird was planning to build a nest, but then Dodo noticed that the twigs were much too small and thin, and whispered to Big Bird that he should not buy them. "But the man said these are wonderful twigs," answered Big Bird. Then Dodo asked, "Who do you believe? Your friend Dodo, or a stranger?" "I believe you," said Big Bird, and he told the man he was sorry, but he could not buy any twigs from him. The man was so upset, that he cried as he walked away from Dodo and Big Bird.
- That was a good story about I and Big Bird.
- The man asked if, in the spring, Big Bird was planning to build a new nest.
- I asked Big Bird who he believed.
- The man cried as he walked away from Big Bird and me.

Dodo was playing with Miss Piggy, when a little frog hopped up to them. Miss Piggy said, "Maybe that frog is really a prince. I wonder... I think I'll kiss him, and see if he turns into a prince." So she did kiss him, but nothing happened. The next day, they saw the frog again, and Miss Piggy kissed him again, but nothing happened. This continued for three days. Every day, the frog hopped up to Dodo and Miss Piggy. Every day, Miss Piggy kissed the frog, but nothing happened. Finally, Dodo asked Miss Piggy, "Are you going to kiss him again tomorrow? It doesn't seem to be working." Miss Piggy answered, "I guess you're right. I'll kiss him one more time now, and if he doesn't turn into a prince, I'll never kiss him again." So she gave the frog a big kiss, and he did turn into a prince. As a thank you for turning him back, he gave gold coins to Miss Piggy and Dodo.
- A little frog hopped up to me and Miss Piggy.
- Miss Piggy wondered if really, the frog was a prince.
- The frog hopped up to Miss Piggy and I every day.

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- I asked if, tomorrow, Miss Piggy were going to kiss the frog again.
- The prince gave gold coins to I and Miss Piggy.

Ernie's father decided to take him to the circus. Ernie wanted to invite his two friends, Moe and Joe to come along, but his father said he could only pick one of them. "Which friend did you choose?" Ernie's father asked him. Ernie said that he decided to take Moe to the circus. Since Joe couldn't go to the circus, Ernie invited him to go bowling the next day. At the bowling alley, Ernie's dad asked Joe, "Are you hungry?" He said he was, so Ernie's dad bought the boys pizza.
- Ernie's father asked whom Ernie picked.
- I remember to which friend Ernie picked for the circus.
- I know to which friend Ernie went bowling with.
- Ernie's dad asked Joe if he were hungry.
- I know with which friend Ernie ate.

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